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Volume II
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STRESS HISTORY SIMULATION

Volume II
A USER'S MANUAL FOR A COMPUTER PROGRAM TO MODIFY STRESS HISTORY SIMULATIONS

MCDONNELL DOUGLAS CORPORATION
MCDONNELL AIRCRAFT COMPANY
P.O. BOX 516
ST. LOUIS, MISSOURI 63166

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AIR FORCE FLIGHT DYNAMICS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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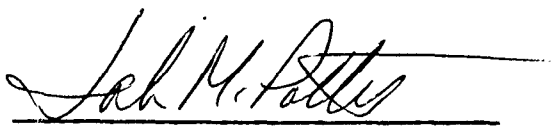
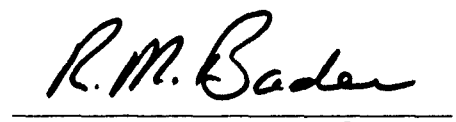
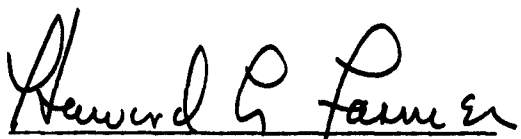


John M. Potter
Project Engineer



ROBERT M. BADER, Chf
Structural Integrity Br

FOR THE COMMANDER



HOWARD L. FARMER, Colonel USAF
Chief, Structural Mechanics Division

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report presents a description of a computer program to combine and modify stress history simulations generated by a companion computer program described in Volume I. Input random stress history data sets are combined and modified to create stress spectra variations. Each variation is characterized by its mission mix; a mission mix consists of a particular order of mission types (Air-to-Air, Air-to-Ground, and Instrumentation and Navigation). An example problem is included which demonstrates the program output; a

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sequential list of peaks and valleys of the flight by flight spectrum, and a summary table of the coupling of the peaks and valleys. Both of the computer programs were used in a study of load sequence effects on crack growth, summarized in AFFDL-TR-76-112,"Effects of Fighter Attack Spectrum on Crack Growth".

FOREWORD

This report was prepared by McDonnell Aircraft Company (MCAIR) St. Louis, Missouri, for the Structural Integrity Branch, Structural Mechanics Division, Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio under Contract F33615-75-C-3112, Project 486U "Advanced Metallic Structures", Work Unit 486U0213, "Effect of Fighter Attack Spectrum on Crack Growth". The contract was administered by John M. Potter, Project Engineer, AFFDL/FBE.

The computer program that was developed during this study was accomplished by the Strength Department of McDonnell Aircraft Company (MCAIR). The study manager for MCAIR was J. F. Schier. Principal authors of this report are H. T. Young, F. R. Foster and H. D. Dill. L. F. Impellizzeri contributed to spectra development of the study.

This report covers work accomplished during the time peiod May 1975 through July 1976.

This report was released by the authors in August 1976 for publication.

TABLE OF CONTENTS

1. SUMMARY

The computer program described in this report was developed for use in a study of load sequence effects on crack growth, described in Reference 1. Cycle by cycle stress histories were generated using techniques based on random noise theory, these techniques were implemented in a computer program described in Volume I, Reference 2. Using that program, stress histories were generated for three baseline spectra: Air-to-Air, Air-to-Ground, and Instrumentation and Navigation. Using the program described in this report, a combination of these was created to form the fourth baseline spectrum, the Composite. The stress histories for these four baseline spectra were modified to create 102 spectra variations.

2. PROGRAM OUTLINE

This program combines and modifies stress history simulations, generated by a companion computer program, and creates four baseline spectra and 102 spectra variations. The baseline spectra are Air-to-Air (A-A), Air-to-Ground (A-G), Instrumentation and Navigation (I&N), and Composite. The spectra variation types are (a) Re-ordering of loads within a mission, (b) Sequence of missions, (c) Individual flight length, (d) Mission mix, (e) Individual flight length, (f) High and low load truncation, (g) Compression loads, (h) Exceedance curve variations, and (i) Coupling of peaks and valleys. Input to the program includes control numbers to create the spectra variations, and data sets of peak and valley stress history simulations obtained from the companion computer program, Volume I. Output includes a sequential list of peaks and valleys, and a table summarizing peak and valley coupling. Input and output are described in Sections 3 and 4, respectively.

The program consists of a main program and eight subroutines, as outlined in Figure 1. The function of each sub-program is described in the following paragraphs.

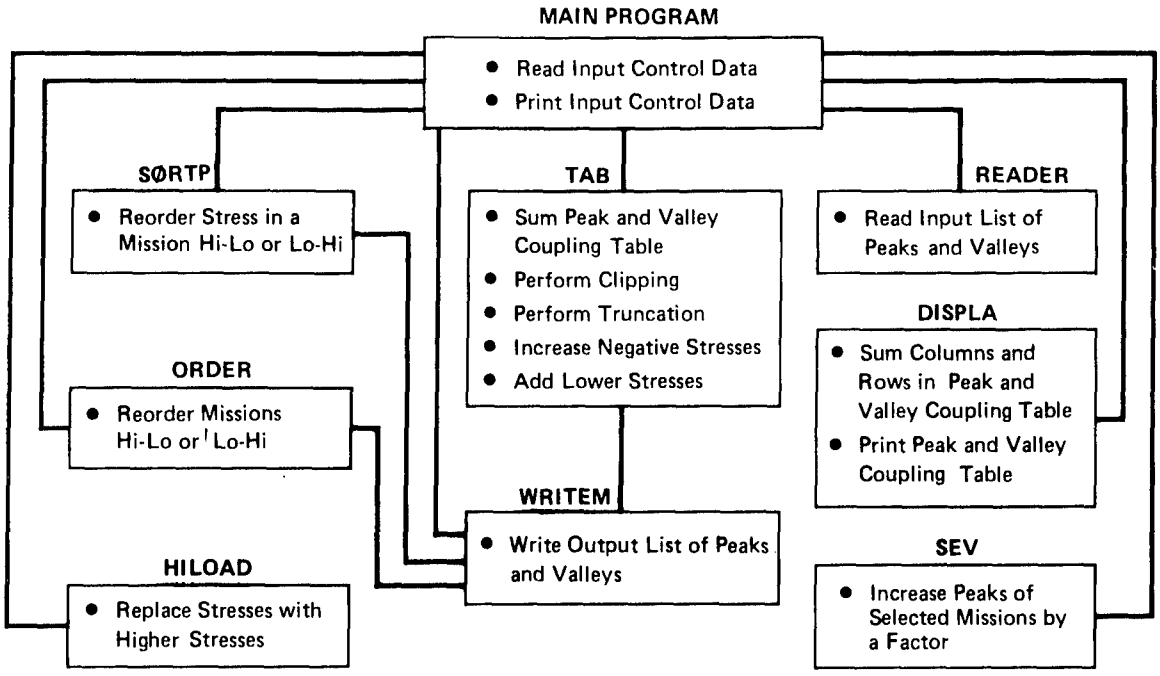

FIGURE 1. SUBPROGRAMS USED IN MODIFYING STRESS TIME HISTORIES

Main Program - The main program reads the input control data and prints the input data to permit a check. Subroutine READER is called to read the initial data sets of peak and valley stress history of each mission type (A-A, A-G, I&N) to be used in the spectrum. The main program is divided into three main process loops. Each loop develops the spectrum variation for a specific mission type either within the loop or by calling an appropriate subroutine.

The three main process loops are very similar. They develop the flight-by-flight spectrum from the input peak and valley stress history by replacing selected valleys with stresses representing ground loads. As more peak and valley stress history is needed, subroutine reader is called and an additional data array of the required mission type is read. A series of IF tests, controlled by input data, determines the variations to be performed. The only variation performed within the main process loops is associated with coupling of peaks and valleys. The remainder of the variations are performed by subroutines SORTP, ORDER, SEV, HILØAD and TAB. Messages at the end of the main program inform the user of input irregularities, such as a spectrum not ending with a stress representing ground load.

Subroutine READER - This subroutine reads input sets of peak and valley stress history. The peak and valley sequence of stresses is maintained by deletion of the first stress value of the new data set, if necessary. The mission type is controlled by the input variable IØ (1 = A-A, 2 = A-G, 3 = I&N).

Subroutine WRITEM - This subroutine is used to generate and write a sequential list of peaks and valleys. The array LIN contains a single line of data. IR is a count of number of values per line, with a maximum value of ten.

Subroutine TAB - This subroutine has a dual purpose. First, it develops a table summarizing coupling of peaks and valleys which becomes a portion of program output. Secondly, it performs variations common to all mission types (A-A, A-G, I&N) such as clipping, increasing the magnitude of negative maneuver stresses, truncations and addition of low stresses.

Subroutine DISPLA - This subroutine creates the column and line totals in the table summarizing coupling of peaks and valleys.

Subroutine SEV - This subroutine increases the severity of the peaks in selected missions.

Subroutine HILOAD - This subroutine replaces cycles with cycles containing the desired higher loads.

Subroutine SORTP - This subroutine reorders the loads within each mission either in a Hi-Lo or Lo-Hi sequence.

Subroutine ORDER - This subroutine reorders all missions into either a Hi-Lo or Lo-Hi sequence, based on the largest peak in each mission.

3. INPUT DATA REQUIREMENTS

Input to the program consists of control data to create the spectra variations, and three data sets containing peak and valley stress histories generated by companion computer program described in Volume I. These latter sets are identified as (1) A-A, (2) A-G, and (3) I&N.

The first input control data are LINE1 and GLØAD. These are used to describe the mission mix (combination of A-A, A-G, and I&N) and, for each mission type, the stress representing the ground load. The completion of the mission mix description is signaled by input of the value END for LINE1. After completion of the mission mix description, a series of forty-two indicators are read. Combinations of these indicators were used to create the 102 spectra variations studied in the work summarized in Reference 1.

The input data format is described in the computer program listing, via comment cards, Appendix A. Example input is presented in Appendix B; the data used to create the spectra studied in Reference 1 is listed in Appendix C.

4. OUTPUT DESCRIPTION

The output consists of three sets. The first set is an echo of the input control data to permit a check.

The second set is a list of the cycle by cycle load spectrum; an option permits this spectrum to be written on a magnetic tape. The cycle by cycle load spectrum is listed both before and after reordering for spectrum variations with reordering of loads within a mission or with reordering of missions.

The third data is a table summarizing the coupling of peaks and valleys. The table has the valley (% Design Limit Stress) as the ordinate and peak (% Design Limit Stress) as the absicca.

Example output is presented in Appendix B.

5. REFERENCES

1. Dill, H. D., and Saff, C. R., "Effect of Fighter Attack Spectrum on Crack Growth", AFFDL-TR-76-112, October 1976.

2. Dill, H. D., Young, H. T., "Stress History Simulation, Vol. I - A User's Manual for a Computer Program to Generate Stress History Simulations", AFFDL-TR-76-113, Vol. I, October 1976.

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LEVEL 21.7 ( JAN 73 )                    OS/360  FORTRAN H

      COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                        SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                                SPECGN2
C     THIS PROGRAM TAKES RANDOM STRESS HISTORY DATA AND
C     DEVELOPS THE FOUR BASELINE SPECTRA AND THE VARIOUS
C     SPECTRA VARIATIONS.
C     THE PROGRAM WAS WRITTEN AT MCDONNELL AIRCRAFT COMPANY FOR
C     THE IBM 370-195 OS USING FORTRAN IV DURING DECEMBER OF 1975
C     BY RICK FOSTER AND TOM YOUNG.
C     THE PROGRAM MAKES USE OF THREE MAIN PROCESS LOOPS IN ORDER TO
C     FACILITATE CONSTRUCTION OF A COMBINATION OF MISSION TYPES IN A
C     GIVEN MISSION MIX.EACH MISSION TYPE(AA,AG,IN) MAY HAVE INDIVIDUAL
C     CHARACTERISTICS AND OR CONSTRAINTS.
C
C
C     THE INPUT DATA FOLLOWS . . . .
C
C     INPUT DATA REQUIREMENTS
C     - - - - - - - - - - - -
C
C     INPUT TO THE PROGRAM CONSISTS OF THREE
C     DATA SETS CONTAINING THE PEAK AND
C     VALLEY STRESS HISTORY FOR THE THREE
C     MISSION TYPES (A-A, A-G, ING), DATA
C     DEFINING THE MISSION MIX, AND 42
C     INDICATORS USED TO CREATE THE
C     SPECTRUM VARIATIONS
C
C     INPUT DATA FORMAT
C     - - - - - - - - -
C     THE PROGRAM INPUT IS:
C     LINE1(1),LINE1(2),LINE1(3),LINE1(4),LINE1(5),LINE1(6),LINE1(7),GLOAD     *
C     MISNO,LODVAL,ADDV(1),ADDP(1),ADDV(2),ADDP(2),ADDV(3),ADDP(3),ADDV(4),ADDP(4)
C     IND1,IND2
C     IND3,IND4
C     IND5,IV1,IV2,IV3,IV4,IND6,IV5,IV6
C     IND7,IND8,IND9,IV7,IV8,IV9,IV10,IV11,IV12
C     IND10,IV13,IND11,IV14,IND12,IV15,IV16,IND13
C     IND14,IND15,IND16
C
C                       FORMAT
C
C     A4, I8, 5I6, F6.1    *
C     2I4, 8F8.1
C     2I8
C     2I8
C     8I8
C     4I8, 2F8.1, I8, 2F8.1, I8
C     3I8
C     * THE PROGRAM PERMITS FROM 1 AND 10 MISSION TYPES, THE FIRST LINE
C     REPRESENTS 1 MISSION TYPE.  END OF MISSION MIX IS IDENTIFIED BY
C     INPUT OF END (A4)
```

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C     LINE1(1) = MISSION TYPE (AA, AG, OR IN)
C     LINE1(2) = NUMBER IDENTIFYING FIRST STRESS TO BE USED FROM THE RANDOM HISTORY
C     LINE1(3) = NUMBER IDENTIFYING LAST STRESS TO BE USED FROM THE RANDOM HISTORY.
C     LINE1(4) = NUMBER OF STRESSES PER MISSION.
C     LI1EU(5) = NUMBER OF MISSIONS WITH LINE1(4).
C     LINE1(6) = NUMBER OF STRESSES PER MISSION.
C     LINE1(7) = NUMBER OF MISSIONS WITH LINE1(6).
C     GLOAD    = STRESS REPRESENTING GROUND LOAD FOR EACH MISSION.
C     MISNUM   = THE NUMBER OF MISSIONS IN THE SPECTRUM.
C     LODVAL   = THE NUMBER OF HIGH STRESSES BEING ADDED.  (MAXIMUM OF 4)
C                THE FOLLOWING GROUP IS INPUT ONLY IF LODVAL>0.
C     ADDV (1) = THE VALLEY OF THE FIRST HIGH STRESS LEVEL ADDED.
C     ADDP (1) = THE PEAK OF THE FIRST HIGH STRESS LEVEL ADDED.
C     ADDV (2) = THE VALLEY OF THE SECOND STRESS LEVEL ADDED.
C     ADDP (2) = THE PEAK OF THE SECOND STRESS LEVEL ADDED.
C     ADDV (3) = THE VALLEY OF THE THIRD STRESS LEVEL ADDED.
C     ADDP (3) = THE PEAK OF THE THIRD HIGH STRESS LEVEL ADDED.
C     ADDV (4) = THE VALLEY OF THE FOURTH HIGH STRESS LEVEL ADDED.
C     ADDP (4) = THE PEAK OF THE FOURTH HIGH STRESS LEVEL ADDED.
C     IND1     = (0)   NO REORDERING OF STRESSES WITHIN A MISSION.
C                (1)   REORDERING OF STRESSES WITHIN A MISSION.
C     IND2     = USED ONLY IF IND1 = 1.
C                (0)   REORDERING OF STRESSES HI TO LO WITHIN A MISSION.
C                (1)   REORDERING OF STRESSES LO TO HI WITHIN A MISSION.
C     IND3     = (0)   NO REORDERING OF MISSIONS.
C                (1)   REORDERING OF MISSION BY MAXIMUM HIGH STRESS.
C     IND4     = USED ONLY IF IND3 = 1.
C                (0)   REORDER THE MISSIONS HI TO LO.
C                (1)   REORDER THE MISSIONS LO TO HI.
C     IND5     = (0)   NO INCREASED SEVERITY IN A=A MISSIONS.
C                (1)   INCREASED SEVERITY OF STRESSES IN A=A MISSIONS.
C     IV1      = USED ONLY IF IND5 = 1, NUMBER IDENTIFYING FIRST AA MISSION WITH
C                INCREASED SEVERITY, FIRST SET OF MISSIONS.
C     IV2      = USED ONLY IF IND5 = 1, NUMBER IDENTIFYING LAST AA MISSION
C                WITH INCREASED SEVERITY, FIRST SET OF MISSIONS.
C     IV3      = USED ONLY IF IND5 = 1, NUMBER IDENTIFYING FIRST AA MISSION WITH
C                INCREASED SEVERITY, SECOND SET OF MISSIONS.
C     IV4      = USED ONLY IF IND5 = 1, NUMBER IDENTIFYING LAST AA MISSION WITH
C                INCREASED SEVERITY, SECOND SET OF MISSIONS.
C     IND6     = (0)   NO INCREASED SEVERITY IN AG MISSIONS.
C                (1)   INCREASED SEVERITY OF STRESSES IN AG MISSIONS.
C     IV5      = USED ONLY IF IND6 = 1, NUMBER IDENTIFYING FIRST AG MISSION WITH
C                INCREASED SEVERITY, FIRST SET OF MISSIONS.
C     IV6      = USED ONLY IF IND6 = 1, NUMBER IDENTIFYING LAST AG MISSION WITH
C                INCREASED SEVERITY, SECOND SET OF MISSIONS.
C     IND7     = (0)   NO ADDITIONAL LOW STRESSES TO BE ADDED.
C                (1)   ADDITIONAL LOW STRESSES ARE TO BE ADDED.
C     IND8     = USED ONLY IF IND7 = 1.
C                (0)   ADDITIONAL LOW STRESSES ARE ADDED TO ALL MISSION TYPES.
C                (1)   ADDITIONAL LOW STRESSES ARE ADDED TO AA MISSIONS ONLY.
C                (2)   ADDITIONAL LOW STRESSES ARE ADDED TO AG MISSIONS ONLY.
C                (3)   ADDITIONAL LOW STRESSES ARE ADDED TO IN MISSIONS ONLY.
C     IND9     = USED ONLY IF IND7 = 1.
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C                (0)  ADDITION OF TYPE ONE LOW STRESS CYCLES.
C                (1)  ADDITION OF TYPE TWO LOW STRESS CYCLES.
C     IV7        = USED ONLY IF IND7 = 1, NUMBER OF CYCLES BETWEEN ADDED TYPE ONE LOW
C                  STRESS CYCLES.
C     IV8        = USED ONLY IF IND7 = 1, THE VALLEY BEING ADDED FOR TYPE ONE LOW
C                  STRESS CYCLES.
C     IV9        = USED ONLY IF IND7 = 1, THE PEAK BEING ADDED FOR TYPE ONE LOW
C                  STRESS CYCLES.
C     IV10       = USED ONLY IF IND7 = 1 AND IND9 = 1, NUMBER OF CYCLES BETWEEN TYPE
C                  TWO LOW STRESS CYCLES.
C     IV11       = USED ONLY IF IND7 = 1 AND IND9 = 1, THE VALLEY BEING ADDED FOR
C                  TYPE TWO LOW STRESS CYCLES.
C     IV12       = USED ONLY IF IND7 = 1 AND IND9 = 1, THE PEAK BEING ADDED FOR TYPE
C                  TWO LOW STRESS CYCLES.
C     IND10      = (0)  NO TRUNCATION OF PEAKS
C                  (1)  PEAKS ARE TRUNCATED.
C     IV13       = .1 USED ONLY IF IND10 = 1, THE STRESS LEVEL OF THE TRUNCATION.
C     IND11      = (0)  NO CLIPPING OF PEAKS.
C                  (1)  PEAKS ARE CLIPPED.
C     IV14       = USED ONLY IF IND11 = 1, THE STRESS LEVEL OF THE CLIPPING.
C     IND12      = (0)  NO CLIPPING OF VALLEYS OR INCREASING OF THE MAGNITUDE OF
C                       NEGATIVE MANEUVER STRESSES.
C                  (1)  CLIPPING OF VALLEYS.
C                  (2)  INCREASING OF THE MAGNITUDE OF NEGATIVE MANEUVER STRESSES.
C     IV15       = USED ONLY IF IND12 = 1 OR 2, THE LOAD LEVEL OF VALLEY CLIPPING OR
C                  THE LOAD LEVEL BELOW WHICH NEGATIVE MANEUVER STRESSES ARE INCREASE
C     IV16       = USED ONLY IF IND12(2) = 2
C                  (X.XX)  THE PERCENTAGE, EXPRESSED AS A DECIMAL, INCREASE OF
C                          NEGATIVE MANEUVER STRESSES.
C                  (1.00)  NO INCREASE, VALLEYS ARE CLIPPED.
C     IND13      = (0)  NO ADDITION OF HIGHER STRESS LEVELS.
C                  (1)  HIGHER STRESS LEVELS ARE ADDED.
C                  IND14 AND IND15 CONTROL CHANGES OF SPECIFIC STRESSES TO MATCH THE
C                  THE ORIGINAL BASELINE EXCEEDANCE CURVES STUDIED IN THE RESEARCH
C                  "EFFECT OF FIGHTER ATTACK SPECTRUM ON CRACK GROWTH".
C     IND14      = (0)  NO CHANGE IS MADE TO THE SPECTRUM.
C                  (2)  A-A, NO/NP = .51 VARIATION IN COUPLING PEAKS AND VALLEYS.
C                  (3)  A-A, NO/NP = .75 VARIATION IN COUPLING PEAKS AND VALLEYS.
C                  (4)  A-A, NO/NP = 1.0 VARIATION IN COUPLING PEAKS AND VALLEYS.
C     IND15      = (0)  NO CHANGE IS MADE TO THE SPECTRUM.
C                  (1)  A-G NO/NP = 1, VARIATION IN COUPLING PEAKS AND VALLEYS.
C     IND16      = (0)  NO CHANGE OF VALLEYS LESS THAN 1G IN MAGNITUDE.
C                  (1)  VALLEYS GREATER THAN 1G ARE SET = 1G (12.5% DLS).
C     IN ADDITION THERE ARE THREE DATA SETS:
C     DATA SET (1)       AIR-TO-AIR HISTORY
C     DATA SET (2)       AIR-TO-GROUND HISTORY
C     DATA SET (3)       INSTRUMENT HISTORY
C
C
ISN 0002          INTEGER LIST1(3),MIX(10,7),LINE1(7)
ISN 0003          INTEGER END,WHERE
ISN 0004          INTEGER MTYPE(3),HWMNY,EOFAA,EOFAG,EOFIN,FREQ
```

```
ISN  0005            REAL GLOAD,GLOADS(10)
ISN  0006            REAL AADUM(2),AA(12000)
ISN  0007            REAL AGDUM(2),AG(13000)
ISN  0008            REAL INDUM(2),IN(10000),LIN(10)
ISN  0009            REAL IV8,IV9,IV11,IV12,IV13,IV14,IV15,IV16
ISN  0010            REAL INLAS,INNM1,PEAK(100),VALLEY(100)
ISN  0011            INTEGER TABLE
ISN  0012            COMMON/HOUSE/ADDV(4),ADDP(4),LODVAL,GLOAD
ISN  0013            COMMON/LAW/ TABLE(30,30),TVV,TVP,LIN,LLL
ISN  0014            COMMON/INDIE/IND1,IND2,IND3,IND4,IND5,IND6,IND7,
                    *IND8,IND9,IND10,IND11,IND12,IND13,IND14,IND15,
                    *IND16,IV1,IV2,IV3,IV4,IV5,IV6,IV7,IV8,IV9,IV10,
                    *IV11,IV12,IV13,IV14,IV15,IV16
ISN  0015            COMMON/VALLEY/VNM1
ISN  0016            DATA MIX/70*0/,IAA/0/,IAG/0/,IIN/0/
ISN  0017            DATA ISAA,ISAG,ISIN/3*0/,LLINC/0/
ISN  0018            DATA LIST1/'AA  ','AG  ','IN  '/
ISN  0019            DATA MTYPE,END/3*0,'END '/
ISN  0020            DATA NPAA/0/,NPAG/0/,NPIN/0/,IR/1/,IPICK/-1/
ISN  0021            DATA EOFAA/0/,EOFAG/0/,EOFIN/0/,MISION/1/,FAC/1.10/
ISN  0022            DATA AANM1,AGNM1,INNM1,AALAS,AGLAS,INLAS/3*0.,3*1./
ISN  0023            DATA AADUM,AGDUM,INDUM/6*0.0/,ICT/0/
ISN  0024            I=0
ISN  0025            DO 5 IZIP=1,30
ISN  0026            DO 5 JZIP=1,30
ISN  0027          5   TABLE(IZIP,JZIP)=0.0
ISN  0028            TVV=52.5
ISN  0029            TVP=2.5
ISN  0030          1   READ(5,101,END=98) LINE1,GLOAD
ISN  0031        101   FORMAT(A4,I8,5I6,2F6.1)
ISN  0032            IF(LINE1(1).EQ.END)GO TO 11
ISN  0034            DO 2 J=1,3
ISN  0035            IF(LINE1(1).EQ.LIST1(J))GO TO 3
ISN  0037          2   CONTINUE
ISN  0038            STOP 2
ISN  0039         98   STOP 98
C
C     EACH INPUT RECORD IS IDENTIFIED AS TO VALID TYPE.(AA,AG,IN)
C     INFORMATION FROM VALID INPUT RECORDS IS THEN STORED IN THE MISSION
C     MIX TABLE.AN 'END' CARD SIGNALS THE END OF THE INPUT DATA.
C
ISN  0040          3   I=I+1
ISN  0041            MIX(I,1)=J
ISN  0042            DO 4 J=2,7
ISN  0043            MIX(I,J)=LINE1(J)
ISN  0044          4   CONTINUE
ISN  0045            GLOADS(I)=GLOAD
ISN  0046            GO TO 1
ISN  0047         11   WRITE(9,202)I
ISN  0048        202   FORMAT('1  THE NUMBER OF GROUPS IS',I3)
ISN  0049            WRITE(9,102)((LIST1(MIX(II,1)),(MIX(II,JJ),JJ=2,7)),
                    * GLOADS(II),II=1,I)
ISN  0050        102   FORMAT(1X,A4,I8,5I6,F6.1)
```

```
ISN 0051          READ(5,103,END=17)MISNUM,LODVAL,(ADDV(IV),ADDP(IV),IV=1,4)
ISN 0052      103 FORMAT(2I4,8F8.1)
ISN 0053          READ(5,105)IND1,IND2
ISN 0054          READ(5,105)IND3,IND4
ISN 0055          READ(5,105)IND5,IV1,IV2,IV3,IV4,IND6,IV5,IV6
ISN 0056          READ(5,106)IND7,IND8,IND9,IV7,IV8,IV9,IV10,IV11,IV12
ISN 0057          READ(5,107)IND10,IV13,IND11,IV14,IND12,IV15,IV16,IND13
ISN 0058          READ(5,105)IND14,IND15,IND16
ISN 0059      105 FORMAT(8I8)
ISN 0060      106 FORMAT(4I8,2F8.1,I8,2F8.1)
ISN 0061      107 FORMAT(I8,F8.1,I8,F8.1,I8,2F8.1,I8)
ISN 0062          IF(LODVAL.EQ.0)GO TO 716
ISN 0064          FREQ=MISNUM/LODVAL
ISN 0065          WRITE(9,104)FREQ
ISN 0066      104 FORMAT(/' A HIGH LOAD IS BEING ADDED DURING EVERY',I5
                 * ,' MISSION.')
ISN 0067      716 WRITE(9,117)MISNUM,LODVAL
ISN 0068          IF(LODVAL.EQ.0)GO TO 119
ISN 0070          WRITE(9,118)(ADDV(IV),ADDP(IV),IV=1,4)
ISN 0071      117 FORMAT(//T2,'MISNUM=',I4,T16,'LODVAL=',I4)
ISN 0072      118 FORMAT(T2,'V=',F6.1,T11,'P=',F6.1,T20,'V=',F6.1,T29,
                *'P=',F6.1,T38,'V=',F6.1,T47,'P=',F6.1,T56,'V=',F6.1,
                *T65,'P=',F6.1)
ISN 0073          WRITE(9,108)IND1,IND2
ISN 0074          WRITE(9,109)IND3,IND4
ISN 0075          WRITE(9,110)IND5,IV1,IV2,IV3,IV4
ISN 0076          WRITE(9,111)IND6,IV5,IV6
ISN 0077          WRITE(9,112)IND7,IND8,IND9,IV7,IV8
ISN 0078          WRITE(9,113)IV9,IV10,IV11,IV12
ISN 0079          WRITE(9,114)IND10,IV13,IND11,IV14,IND12
ISN 0080          WRITE(9,115)IV15,IV16,IND13
ISN 0081          WRITE(9,116)IND14,IND15,IND16
ISN 0082      108 FORMAT(//T2,'IND1=',I2,T16,'IND2=',I2)
ISN 0083      109 FORMAT(T2,'IND3=',I2,T16,'IND4=',I2)
ISN 0084      110 FORMAT(T2,'IND5=',I2,T16,'IV1=',I5,T30,'IV2=',I5,T44,'IV3=',
                *I5,T58,'IV4=',I5)
ISN 0085      111 FORMAT(T2,'IND6=',I2,T16,'IV5=',I5,T30,'IV6=',I5)
ISN 0086      112 FORMAT(T2,'IND7=',I2,T16,'IND8=',I2,T30,'IND9=',I2,T44,
                *'IV7=',I6,T58,'IV8=',F6.1)
ISN 0087      113 FORMAT(T2,'IV9=',F6.1,T16,'IV10=',I6,T30,'IV11=',F6.1,
                *T44,'IV12=',F6.1)
ISN 0088      114 FORMAT(T2,'IND10=',I2,T16,'IV13=',F6.1,T30,'IND11=',I2,
                *T44,'IV14=',F6.1,T58,'IND12=',I2)
ISN 0089      115 FORMAT(T2,'IV15=',F6.1,T16,'IV16=',F6.1,T30,'IND13=',I2)
ISN 0090      116 FORMAT(T2,'IND14=',I2,T16,'IND15=',I2,T30,'IND16=',I2//)
ISN 0091       17 DO 50 M=1,I
ISN 0092          ID=MIX(M,1)
ISN 0093          MTYPE(ID)=MTYPE(ID)+1
ISN 0094       50 CONTINUE
ISN 0095          GO TO 41
                C
                C  READ THE INITIAL SEED OF EACH MISSION TYPE (AA,AG,IN) TO BE
                C  USED FOR THIS MIX.
```

```
ISN 0096        C
                  41   MIXIT=0
ISN 0097          DO 42 M=1,3
ISN 0098          IF(MTYPE(M).GT.0)MIXIT=MIXIT+1
ISN 0100          42 CONTINUE
ISN 0101          IF(MTYPE(1).EQ.0)GO TO 178
ISN 0103          CALL READER(INPAA,NPAA,AA,1,AALAS,AANM1,EOFAA,INDAA)
ISN 0104          INPAA=INPAA-1
ISN 0105          IF(EOFAA.GT.0)STOP 1106
ISN 0107   178    IF(MTYPE(2).EQ.0)GO TO 188
ISN 0109          CALL READER(INPAG,NPAG,AG,2,AGLAS,AGNM1,EOFAG,INDAG)
ISN 0110          INPAG=INPAG-1
ISN 0111          IF(EOFAG.GT.0)STOP 1206
ISN 0113   188    IF(MTYPE(3).EQ.0)GO TO 198
ISN 0115          CALL READER(INPIN,NPIN,IN,3,INLAS,INNM1,EOFIN,INDIN)
ISN 0116          INPIN=INPIN-1
ISN 0117          IF(EOFIN.GT.0)STOP 1306
                C
                C THIS IS THE START OF THE OUTER PROCESS LOOP.
                C
ISN 0119   198    DO 60 L=1,I
ISN 0120          LLL=MIX(L,1)
ISN 0121          GO TO (70,80,90),LLL
ISN 0122          STOP 60
                C
                C  AA LOOP BEGINS AT THIS POINT...
                C
ISN 0123          70 IF(EOFAA.GT.0)GO TO 60
ISN 0125          IF(IAA.GT.0)GO TO 74
ISN 0127          IF(MIX(L,2).EQ.1)GO TO 74
ISN 0129          IF(MTYPE(LLL).GT.1)GO TO 74
ISN 0131          INPAA=INDAA
ISN 0132          ISTART=MIX(L,2)-1
                C
                C SPIN TO A STARTING POINT...
                C
ISN 0133          DO 71 IS=1,ISTART
ISN 0134          INPAA=INPAA+1
ISN 0135          IF(INPAA.GT.NPAA)CALL READER(INPAA,NPAA,AA,1,AALAS,AANM1,EOFAA
                *,INDAA)
ISN 0137          IF(EOFAA.GT.0)GO TO 60
ISN 0139          71 CONTINUE
ISN 0140          74 HWMNY=MIX(L,3)
ISN 0141          WHERE=MIX(L,2)
ISN 0142          LL=MIX(L,4)
ISN 0143          LLIBIT=LL+MIX(L,5)
ISN 0144          GLOAD=GLOADS(L)
ISN 0145           LIN(IR)=GLOAD
ISN 0146          IF(ISAA.EQ.0)INPAA=INPAA+1
ISN 0148          ISAA=1
ISN 0149          IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0151          DO 77 IQ=WHERE,HWMNY
ISN 0152          IAA=IAA+1
```

```
ISN 0153            INPAA=INPAA+1
ISN 0154            IF(INPAA.GT.NPAA)CALL READER(INPAA,NPAA,AA,1,AALAS,AANM1,EOFAA
                   *,INDAA)
ISN 0156            IF(EOFAA.GT.0)GO TO 60
ISN 0158            IR=IR+1
ISN 0159            IF(AA(INPAA).EQ.GLOAD)AA(INPAA)=GLOAD+.1
                C   XXXXX  COUPLING OF PEAKS AND VALLEYS   XXXXXXX
ISN 0161            IF(IND14.EQ.0) GO TO 75
ISN 0163            IF(IND14.NE.2) GO TO 30
ISN 0165            IF(ABS(AA(INPAA)-105.7).LT..1)AA(INPAA)=114.2
ISN 0167            IF(ABS(AA(INPAA)-100.6).LT..1)AA(INPAA)=111.2
ISN 0169            IF(ABS(AA(INPAA)-100.4).LT..1)AA(INPAA)=109.2
ISN 0171            GO TO 75
ISN 0172         30 IF(IND14.NE.3) GO TO 31
ISN 0174            IF(ABS(AA(INPAA)-105.5).LT..1)AA(INPAA)=114.2
ISN 0176            IF(ABS(AA(INPAA)-104.5).LT..1)AA(INPAA)=111.2
ISN 0178            IF(ABS(AA(INPAA)-102.2).LT..1)AA(INPAA)=109.2
ISN 0180            GO TO 75
ISN 0181         31 IF(IND14.NE.4) GO TO 75
ISN 0183            IF(ABS(AA(INPAA)-104.2).LT..1)AA(INPAA)=114.2
ISN 0185            IF(ABS(AA(INPAA)-102.4).LT..1)AA(INPAA)=111.2
ISN 0187            IF(ABS(AA(INPAA)-102.2).LT..1)AA(INPAA)=109.2
ISN 0189         75 CONTINUE
ISN 0190            LIN(IR)=AA(INPAA)
ISN 0191            IF(IAA/LL*LL.NE.IAA)GO TO 177
ISN 0193            MISION=MISION+1
ISN 0194            LIN(IR)=GLOAD
                C   XXXXX REORDER LOADS WITHIN A MISSION XXX
ISN 0195            IF(IND1.EQ.0) GO TO 173
ISN 0197            CALL SORTP(PEAK,VALLEY,LLINC,GLOAD)
ISN 0198         173 CONTINUE
                C   XXXXX REORDER MISSIONS XXX
ISN 0199            IF(IND3.EQ.0) GO TO 174
ISN 0201            CALL ORDER(PEAK,VALLEY,LLINC,GLOAD)
ISN 0202         174 CONTINUE
ISN 0203            LLINC=0
ISN 0204         177 IPICK=IPICK+(-1)
ISN 0205            IF(IPICK.NE.1)GO TO 278
ISN 0207            LLINC=LLINC+1
ISN 0208            PEAK(LLINC)=AA(INPAA)
ISN 0209            VALLEY(LLINC)=AA(INPAA-1)
ISN 0210            IF(INPAA.EQ.1)VALLEY(LLINC)=VNM1
                C   XXXXX INCREASE SEVERITY OF SELECTED FLIGHTS XXX
ISN 0212            IF(IND5.EQ.0) GO TO 179
ISN 0214            IF(MISION.GT.IV1.AND.MISION.LT.IV2)CALL SEV(AA(INPAA),LIN(IR),FAC)
ISN 0216            IF(IV3.EQ.0) GO TO 179
ISN 0218            IF(MISION.GT.IV3.AND.MISION.LT.IV4)CALL SEV(AA(INPAA),LIN(IR),FAC)
ISN 0220         179 CONTINUE
                C   XXXXX ADDITION OF HIGHER LOAD LEVELS XXX
ISN 0221            IF(IND13.EQ.0) GO TO 180
ISN 0223            IF(MISION/FREQ*FREQ.EQ.MISION)CALL
                   *HILOAD(AA(INPAA-1),AA(INPAA),LIN(IR-1),LIN(IR),MISION)
ISN 0225         180 CONTINUE
```

```
ISN 0226            CALL TAB
                   *(AA(INPAA+1),AA(INPAA),NPAA,INPAA,AA(INPAA+1),IR,LIN(IR-1))
ISN 0227     278    IF(IR.EQ.10.AND.IQ.LT.HWMNY)CALL WRITEM(IR,LIN,8)
ISN 0229            IF(IAA.NE.LLIBIT)GO TO 77
ISN 0231            LL=MIX(L,6)
ISN 0232            LLIBIT=LL*MIX(L,7)
ISN 0233            IAA=0
ISN 0234     77     CONTINUE
ISN 0235            GO TO 60
C
CC   AG LOOP BEGINS AT THIS POINT...
C
ISN 0236     80     IF(EOFAG.GT.0)GO TO 60
ISN 0238            IF(IAG.GT.0)GO TO 84
ISN 0240            IF(MIX(L,2).EQ.1)GO TO 84
ISN 0242            IF(MTYPE(LLL).GT.1)GO TO 84
ISN 0244            INPAG=INDAG
C
CC   SPIN TO A STARTING POINT...
C
ISN 0245            ISTART=MIX(L,2)-1
ISN 0246            DO 81 IS=1,ISTART
ISN 0247            INPAG=INPAG+1
ISN 0248            IF(INPAG.GT.NPAG)CALL READER(INPAG,NPAG,AG,2,AGLAS,AGNM1,EOFAG
                   *,INDAG)
ISN 0250            IF(EOFAG.GT.0)GO TO 60
ISN 0252     81     CONTINUE
ISN 0253     84     HWMNY=MIX(L,3)
ISN 0254            WHERE=MIX(L,2)
ISN 0255            LL=MIX(L,4)
ISN 0256            LLIBIT=LL*MIX(L,5)
ISN 0257            GLOAD=GLOADS(L)
ISN 0258             LIN(IR)=GLOAD
ISN 0259            IF(ISAG.EQ.0)INPAG=INPAG+1
ISN 0261            ISAG=1
ISN 0262            IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0264            DO 87 IQ=WHERE,HWMNY
ISN 0265            IAG=IAG+1
ISN 0266            INPAG=INPAG+1
ISN 0267            IF(INPAG.GT.NPAG)CALL READER(INPAG,NPAG,AG,2,AGLAS,AGNM1,EOFAG
                   *,INDAG)
ISN 0269            IF(EOFAG.GT.0)GO TO 60
ISN 0271            IR=IR+1
ISN 0272            IF(AG(INPAG).EQ.GLOAD)AG(INPAG)=GLOAD+.1
C          XXXXXX  COUPLING OF PEAKS AND VALLEYS   XXXXX
ISN 0274            IF(IND15.EQ.0) GO TO 186
ISN 0276            IF(AG(INPAG).LT.72.5.OR.AG(INPAG).GT.77.5) GO TO 186
ISN 0278            ICT=ICT + 1
ISN 0279            IF(ICT.GT.7) GO TO 186
ISN 0281            AG(INPAG)=80.
ISN 0282     186    LIN(IR)=AG(INPAG)
ISN 0283            IF(IAG/LL*LL.NE.IAG) GO TO 187
ISN 0285            MISION=MISION+1
```

```
ISN 0286            LIN(IR)=GLOAD
                C   XXXXX REORDER LOADS WITHIN A MISSION XXX
ISN 0287            IF(IND1.EQ.0) GO TO 183
ISN 0289            CALL SORTP(PEAK,VALLEY,LLINC,GLOAD)
ISN 0290          183  CONTINUE
                C   XXXXX REORDER MISSIONS XXX
ISN 0291            IF(IND3.EQ.0) GO TO 184
ISN 0293            CALL ORDER(PEAK,VALLEY,LLINC,GLOAD)
ISN 0294          184  CONTINUE
ISN 0295            LLINC=0
ISN 0296          187  IPICK=IPICK*(-1)
ISN 0297            IF(IPICK.NE.1)GO TO 288
ISN 0299            LLINC=LLINC+1
ISN 0300            PEAK(LLINC)=AG(INPAG)
ISN 0301            VALLEY(LLINC)=AG(INPAG-1)
ISN 0302            IF(INPAG.EQ.1)VALLEY(LLINC)=VNM1
                C   XXXXX INCREASE SEVERITY OF SELECTED FLIGHTS XXX
ISN 0304            IF(IND6.EQ.0) GO TO 189
ISN 0306            IF(MISION.GT.IV5.AND.MISION.LT.IV6)CALL SEV(AG(INPAG),LIN(IR),FAC)
ISN 0308          189  CONTINUE
                C   XXXXX ADDITION OF HIGHER LOAD LEVELS XXX
ISN 0309            IF(IND13.EQ.0) GO TO 190
ISN 0311            IF(MISION/FREQ*FREQ.EQ.MISION)CALL
                   *HILOAD(AG(INPAG-1),AG(INPAG),LIN(IR-1),LIN(IR),MISION)
ISN 0313          190  CONTINUE
ISN 0314            CALL TAB
                   *(AG(INPAG-1),AG(INPAG),NPAG,INPAG,AG(INPAG+1),IR,LIN(IR-1))
ISN 0315          288  IF(IR.EQ.10.AND.IQ.LT.HWMNY)CALL WRITEM(IR,LIN,8)
ISN 0317            IF(IAG.NE.LLIBIT)GO TO 87
ISN 0319            LL=MIX(L,6)
ISN 0320            LLIBIT=LL*MIX(L,7)
ISN 0321            IAG=0
ISN 0322           87  CONTINUE
ISN 0323            GO TO 60
                C
                CC  IN LOOP BEGINS AT THIS POINT...
                C
ISN 0324           90  IF(EOFIN.GT.0)GO TO 60
ISN 0326            IF(IIN.GT.0)GO TO 94
ISN 0328            IF(MIX(L,2).EQ.1)GO TO 94
ISN 0330            IF(MTYPE(LLL).GT.1)GO TO 94
ISN 0332            INPIN=INDIN
ISN 0333            ISTART=MIX(L,2)-1
ISN 0334            DO 91 IS=1,ISTART
ISN 0335            INPIN=INPIN+1
ISN 0336            IF(INPIN.GT.NPIN)CALL READER(INPIN,NPIN,IN,3,INLAS,INNM1,EOFIN
                   *,INDIN)
ISN 0338            IF(EOFIN.GT.0)GO TO 60
ISN 0340           91    CONTINUE
ISN 0341           94        HWMNY=MIX(L,3)
ISN 0342            WHERE=MIX(L,2)
ISN 0343            LL=MIX(L,4)
ISN 0344            LLIBIT=LL*MIX(L,5)
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```
ISN 0345            GLOAD=GLOADS(L)
ISN 0346             LIN(IR)=GLOAD
ISN 0347            IF(ISIN.EQ.0)INPIN=INPIN+1
ISN 0349            ISIN=1
ISN 0350            IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
                C
                C  SPIN TO A STARTING POINT...
                C
ISN 0352            DO 97 IQ=WHERE,HWMNY
ISN 0353            IIN=IIN+1
ISN 0354            INPIN=INPIN+1
ISN 0355            IF(INPIN.GT.NPIN)CALL READER(INPIN,NPIN,IN,3,INLAS,INNM1,EOFIN
                   *,INDIN)
ISN 0357            IF(EOFIN.GT.0)GO TO 60
ISN 0359            IR=IR+1
ISN 0360            IF(IN(INPIN).EQ.GLOAD)IN(INPIN)=GLOAD+.1
ISN 0362            LIN(IR)=IN(INPIN)
ISN 0363            IF(IIN/LL*LL.NE.IIN)GO TO 197
ISN 0365            MISION=MISION+1
ISN 0366            LIN(IR)=GLOAD
                C    XXXXX REORDER LOADS WITHIN A MISSION XXX
ISN 0367            IF(IND1.EQ.0) GO TO 193
ISN 0369            CALL SORTP(PEAK,VALLEY,LLINC,GLOAD)
ISN 0370         193  CONTINUE
                C    XXXXX REORDER MISSIONS XXX
ISN 0371            IF(IND3.EQ.0) GO TO 194
ISN 0373            CALL ORDER(PEAK,VALLEY,LLINC,GLOAD)
ISN 0374         194  CONTINUE
ISN 0375            LLINC=0
ISN 0376         197  IPICK=IPICK*(-1)
ISN 0377            IF(IPICK.NE.1)GO TO 298
ISN 0379            LLINC=LLINC+1
ISN 0380            IERROR=0
ISN 0381            PEAK(LLINC)=IN(INPIN)
ISN 0382            VALLEY(LLINC)=IN(INPIN-1)
ISN 0383            IF(INPIN.EQ.1)VALLEY(LLINC)=VNM1
                C    XXXXX ADDITION OF HIGHER LOAD LEVELS XXX
ISN 0385            IF(IND13.EQ.0) GO TO 200
ISN 0387            IF(MISION/FREQ*FREQ.EQ.MISION)CALL
                   *HILOAD(IN(INPIN-1),IN(INPIN),LIN(IR-1),LIN(IR),MISION)
ISN 0389         200  CONTINUE
ISN 0390            CALL TAB
                   *(IN(INPIN-1),IN(INPIN),NPIN,INPIN,IN(INPIN+1),IR,LIN(IR-1))
ISN 0391         298  IF(IR.EQ.10.AND.IQ.LT.HWMNY)CALL WRITEM(IR,LIN,8)
ISN 0393            IF(IIN.NE.LLIBIT)GO TO 97
ISN 0395            LL=MIX(L,6)
ISN 0396            LLIBIT=LL*MIX(L,7)
ISN 0397            IIN=0
ISN 0398          97  CONTINUE
ISN 0399          60  CONTINUE
                C
                C   END OF MAIN PROCESS LOOP...
                C
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```
ISN 0400            IERROR=-1
ISN 0401            IF(LIN(IR).EQ.GLOAD)GO TO 63
ISN 0403         68  IF(IR.EQ.0.AND.LIN(10).EQ.GLOAD)GO TO 63
ISN 0405            IERROR=0
ISN 0406            IF(LIN(IR-1).GT.LIN(IR))GO TO 61
ISN 0408            IR=IR+1
ISN 0409            IERROR=1
ISN 0410         61   LIN(IR)=GLOAD
ISN 0411         63  CALL WRITEM(IR,LIN,8)
ISN 0412            IF(IND1.EQ.0)GO TO 65
ISN 0414            CALL SORTF
ISN 0415         65  CONTINUE
ISN 0416            IF(IND3.EQ.0)GO TO 66
ISN 0418            CALL ORDA(PEAK,VALLEY,LLINC,GLOAD)
ISN 0419         66  CONTINUE
ISN 0420            IF(IERROR.EQ.0)WRITE(9,64)
ISN 0422         64  FORMAT(///' ATTENTION --- THE LAST MISSION ENDED IN A',/
                    *' VALLEY BUT WAS NOT A GROUND LOAD, HENCE THAT VALLEY',/
                    *' WAS CHANGED TO A GROUND LOAD.',////)
ISN 0423            IF(IERROR.EQ.1)WRITE(9,62)
ISN 0425         62   FORMAT(///' ATTENTION --- THE LAST MISSION DID NOT END IN A',/
                    *           ' VALLEY, A GROUND LOAD HAS BEEN ADDED TO COMPLETE',/
                    *           ' THE MISSION...',//)
ISN 0426            MISION=MISION-1
ISN 0427            WRITE(9,277)MISION
ISN 0428        277 FORMAT(/' THE TOTAL NUMBER OF MISSIONS IS',I8,//)
ISN 0429            CALL DISPLA(MISION)
ISN 0430            STOP 1776
ISN 0431            END
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LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C  THIS SUBROUTINE REORDERS THE LOADS WITHIN EACH MISSION EITHER IN
                C  A HILO OR LOHI SEQUENCE.
                C
  ISN 0002              SUBROUTINE SORTP(P,V,LLINC,GLOAD)
  ISN 0003              DIMENSION P(1),V(1),N(100)
  ISN 0004              REAL LIN(10)
  ISN 0005              REAL IV8,IV9,IV11,IV12,IV13,IV14,IV15,IV16
  ISN 0006              COMMON/INDIE/IND1,IND2,IND3,IND4,IND5,IND6,IND7,
                       *IND8,IND9,IND10,IND11,IND12,IND13,IND14,IND15,
                       *IND16,IV1,IV2,IV3,IV4,IV5,IV6,IV7,IV8,IV9,IV10,
                       *IV11,IV12,IV13,IV14,IV15,IV16
  ISN 0007              DATA IR/0/,IX/0/
  ISN 0008              LM1=LLINC-1
  ISN 0009              DO 1 I=1,LLINC
  ISN 0010            1 N(I)=I
                C
  ISN 0011              DO 5 J=1,LM1
  ISN 0012              IND=0
  ISN 0013              DO 4 I=1,LM1
                C IN THE FOLLOWING IF TEST, USE .GT. FOR A DESCENDING SORT OF
                C PEAKS AND .LT. FOR A AESCENDING SORT OF PEAKS.
  ISN 0014              IF(IND2.EQ.0) GO TO 3
  ISN 0016              IF(P(N(I)).LT.P(N(I+1))) GO TO 4
  ISN 0018              GO TO 10
  ISN 0019            3 IF(P(N(I)).GT.P(N(I+1)))GO TO 4
  ISN 0021           10 K=N(I)
  ISN 0022              N(I)=N(I+1)
  ISN 0023              N(I+1)=K
  ISN 0024              IND=1
  ISN 0025            4 CONTINUE
  ISN 0026              IF(IND.EQ.0)GO TO 6
  ISN 0028            5 CONTINUE
  ISN 0029            6 IR=IR+1
  ISN 0030              LIN(IR)=GLOAD
  ISN 0031              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
  ISN 0033              IR=IR+1
  ISN 0034              LIN(IR)=P(N(1))
  ISN 0035              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
  ISN 0037              DO 7 I=2,LLINC
  ISN 0038              IR=IR+1
  ISN 0039              LIN(IR)=V(N(I))
  ISN 0040              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
  ISN 0042              IR=IR+1
  ISN 0043              LIN(IR)=P(N(I))
  ISN 0044              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
  ISN 0046            7 CONTINUE
  ISN 0047              LLINC=0
  ISN 0048              RETURN
  ISN 0049              ENTRY SORTF
  ISN 0050              IERROR=-1
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```
ISN 0051            IF(LIN(IR).EQ.GLOAD)GO TO 63
ISN 0053            IF(LIN(IR-1).GT.LIN(IR))GO TO 61
ISN 0055            IR=IR+1
ISN 0056            IERROR=1
ISN 0057        61  LIN(IR)=GLOAD
ISN 0058        63  CALL WRITEM(IR,LIN,10)
ISN 0059            RETURN
ISN 0060            END
```

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LEVEL 21.7 ( JAN 73 )                                   OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C  THIS SUBROUTINE REORDERS ALL MISSIONS INTO EITHER A HILO OR LOHI
                C  SEQUENCE BASED ON THE LARGEST PEAK IN EACH MISSION.
                C
   ISN 0002             SUBROUTINE ORDER(P,V,LLINC,GLOAD)
   ISN 0003             REAL LIN(10)
   ISN 0004             REAL IV8,IV9,IV11,IV12,IV13,IV14,IV15,IV16
   ISN 0005             COMMON/INDIE/IND1,IND2,IND3,IND4,IND5,IND6,IND7,
                       *IND8,IND9,IND10,IND11,IND12,IND13,IND14,IND15,
                       *IND16,IV1,IV2,IV3,IV4,IV5,IV6,IV7,IV8,IV9,IV10,
                       *IV11,IV12,IV13,IV14,IV15,IV16
   ISN 0006             DIMENSION PEAKMX(1200),J(1200),P(1),V(1)
   ISN 0007             DATA IFLT/0/,IPASS/0/,IR/0/
                C
   ISN 0008             DEFINE FILE 4(1200,100,U,IO)
   ISN 0009             V(1)=GLOAD
                C
                C        FIND THE LARGEST PEAK OF EACH MISSION...
                C
   ISN 0010             VALUE=P(1)
   ISN 0011             DO 1 I=2,LLINC
   ISN 0012             IF(P(I).GT.VALUE)VALUE=P(I)
   ISN 0014           1 CONTINUE
                C
                C          STORE THE MISSION AND THE LARGEST PEAK...
                C
   ISN 0015             IFLT=IFLT+1
   ISN 0016             PEAKMX(IFLT)=VALUE
   ISN 0017             J(IFLT)=IFLT
                C
                C        STORE THE MISSION, KEYED ON THE FLIGHT NUMBER ON A
                C        DIRECT ACCES DATA SET...
                C
   ISN 0018             WRITE(4'IFLT)LLINC,(P(K),V(K),K=1,LLINC)
   ISN 0019             LLINC=0
   ISN 0020              RETURN
                C
                C          AT THE END OF EACH RUN THE ACCUMULATED PEAKS ARE RANKED
                C          AND THEMISSIONS ARE WRITTEN ACCORDING TO PEAK RANK...
                C
   ISN 0021             ENTRY ORDA(P,V,LLINC,GLOAD)
   ISN 0022             IFLTM1=IFLT-1
   ISN 0023             DO 100 M=1,IFLTM1
   ISN 0024             IND=0
   ISN 0025             DO 10 N=1,IFLTM1
                C IN THE FOLLOWING IF TEST, USE .GT. FOR A DESCENDING SORT OF
                C PEAKS AND .LT. FOR A AESCENDING SORT OF PEAKS.
   ISN 0026             IF(IND4.EQ.0) GO TO 3
   ISN 0028             IF(PEAKMX(J(N)).LT.PEAKMX(J(N+1))) GO TO 10
   ISN 0030             GO TO 4
   ISN 0031           3 IF(PEAKMX(J(N)).GT.PEAKMX(J(N+1)))GO TO 10
```

```
ISN 0033          4   K=J(N)
ISN 0034              J(N)=J(N+1)
ISN 0035              J(N+1)=K
ISN 0036              IND=1
ISN 0037         10   CONTINUE
ISN 0038              IF(IND.EQ.0)GO TO 65
ISN 0040        100   CONTINUE
                C
                C      THE FLIGHTS ARE WRITTEN ACCORDING TO RANK...
                C
ISN 0041         65   IO=J(1)
ISN 0042              FIND(4'IO)
ISN 0043         26   DO 35 M=1,IFLTM1
                C
ISN 0044              READ(4'IO)LLINC,(P(K),V(K),K=1,LLINC)
ISN 0045              IF(IFLTM1.EQ.1)GO TO 29
ISN 0047              IO=J(M+1)
ISN 0048              FIND(4'IO)
ISN 0049        101   FORMAT(2I10,I10)
                C
ISN 0050         29   DO 30 K=1,LLINC
ISN 0051              IR=IR+1
ISN 0052              LIN(IR)=V(K)
ISN 0053              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
ISN 0055              IR=IR+1
ISN 0056              LIN(IR)=P(K)
ISN 0057              IF(IR.EQ.10)CALL WRITEM(IR,LIN,10)
ISN 0059         30   CONTINUE
                C
ISN 0060         35   CONTINUE
                C
ISN 0061              IF(IFLTM1.EQ.1)GO TO 45
                C
ISN 0063              IFLTM1=1
ISN 0064              GO TO 26
                C
ISN 0065         45   IR=IR+1
ISN 0066              LIN(IR)=GLOAD
ISN 0067              CALL WRITEM(IR,LIN,10)
                C
ISN 0068              WRITE(9,50)
ISN 0069         50   FORMAT('1 THIS IS A LIST OF THE ORDERED MAXIMUM PEAKS...'//)
ISN 0070              WRITE(9,51)(K,PEAKMX(K),J(K),PEAKMX(J(K)),K=1,IFLT)
ISN 0071         51   FORMAT(I10,F10.1,I10,F10.1)
ISN 0072              RETURN
ISN 0073              END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C   THE PURPOSE OF THIS SUBROUTINE IS TO REPLACE SELECTED CYCLES
                C   WITH CYCLES CONTAINING HIGHER LOADS.
                C
  ISN 0002              SUBROUTINE HILOAD(V,P,VL,PL,MISION)
  ISN 0003              COMMON/HOUSE/ADDV(4),ADDP(4),LODVAL,GLOAD
  ISN 0004              DATA I/0/,LASMIS/-999/
  ISN 0005              IF(VL.EQ.GLOAD)RETURN
  ISN 0007              IF(MISION.EQ.LASMIS)RETURN
  ISN 0009              IF(V.GT.0.0.AND.P.LT.50.0)GO TO 1
  ISN 0011              RETURN
  ISN 0012            1 I=I+1
                C         WRITE(9,2)MISION,LODVAL,I,V,P,VL,PL
  ISN 0013            2 FORMAT(' MISION=',I5,9X,'LODVAL=',I5,9X,'I=',I5,5X,4F8.1)
  ISN 0014              IF(I.GT.LODVAL)RETURN
  ISN 0016              V=ADDV(I)
  ISN 0017              VL=V
  ISN 0018              P=ADDP(I)
  ISN 0019              PL=P
  ISN 0020              LASMIS=MISION
  ISN 0021              RETURN
  ISN 0022              END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C   THE PRIMARY FUNCTION OF SUBROUTINE TAB IS TO DEVELOP AN
                C   OCCURANCE TABLE.TAB MAY ALSO BE USED FOR VARIATIONS COMMON
                C   TO ALL TYPES OF DATA(AA,AG,IN) SUCH AS ADDING LOADS,
                C   TRUNCATIONS,OR CLIPPING.
                C
  ISN 0002            SUBROUTINE TAB(V,P,NP,NPINC,NEXTV,IR,VGL)
  ISN 0003            REAL NEXTV,LIN(10)
  ISN 0004            REAL IV8,IV9,IV11,IV12,IV13,IV14,IV15,IV16
  ISN 0005            INTEGER TABLE
  ISN 0006            COMMON/LAW/TABLE(30,30),TVV,TVP,LIN,LLL
  ISN 0007            COMMON/HOUSE/DUMMY(9),GLOAD
  ISN 0008            COMMON/INDIE/IND1,IND2,IND3,IND4,IND5,IND6,IND7,
                     *IND8,IND9,IND10,IND11,IND12,IND13,IND14,IND15,
                     *IND16,IV1,IV2,IV3,IV4,IV5,IV6,IV7,IV8,IV9,IV10,
                     *IV11,IV12,IV13,IV14,IV15,IV16
  ISN 0009            IF(NPINC.EQ.1)V=VGL
  ISN 0011            DATA IC/0/
  ISN 0012            ISWT=0
  ISN 0013            IF(IND7.EQ.0)ISWT=2
                C    XXXXX CLIPPING OR INC. MAG. OF NEG. MAN. LOADS XXXXX
  ISN 0015            IF(IND11.EQ.0) GO TO 8
  ISN 0017            IF(P.LT.IV14)GO TO 8
  ISN 0019            P=IV14
  ISN 0020            LIN(IR)=IV14
  ISN 0021          8 CONTINUE
  ISN 0022            IF(IND12.EQ.0) GO TO 9
  ISN 0024            IF(IND12.EQ.2)GO TO 11
  ISN 0026            IF(V.LT.IV15) V=IV15*IV16
  ISN 0028            IF(LIN(IR-1).EQ.GLOAD) GO TO 9
  ISN 0030            IF(LIN(IR-1).LT.IV15) LIN(IR-1)=IV15*IV16
  ISN 0032            GO TO 9
  ISN 0033         11 IF(V.LT.IV15) V=V*IV16
  ISN 0035            IF(LIN(IR-1).EQ.GLOAD) GO TO 9
  ISN 0037            IF(LIN(IR-1).LT.IV15) LIN(IR-1)=LIN(IR-1)*IV16
  ISN 0039          9 CONTINUE
  ISN 0040            IF(IND16.EQ.0) GO TO 5
  ISN 0042            IF(V.LT.12.5)GO TO 5
  ISN 0044            V=12.5
  ISN 0045            IF(LIN(IR-1).EQ.GLOAD) GO TO 5
  ISN 0047            LIN(IR-1)=12.5
  ISN 0048          5 CONTINUE
                C    XXXXXX TRUNCATION XXXXXXXX
  ISN 0049            IF(IND10.EQ.0) GO TO 10
                C           SOME G.L. WILL APPEAR IN TABLE DURING TRUNC. RUN
  ISN 0051            IF(P.GT.IV13)GO TO 10
  ISN 0053            IF(NPINC+1.NE.NP)GO TO 6
  ISN 0055          7   IR=IR-2
                C       INSURES NO CHANGE OF A GROUND LOAD IN MAIN LINE PROGRAM...
  ISN 0056            NEXTV=NEXTV+0.0001
  ISN 0057            RETURN
```

```
ISN 0058          6    IF(VGL.GT.NEXTV)GO TO 7
ISN 0060               NEXTV=VGL
ISN 0061               GO TO 7
                C
ISN 0062         10    DO 1 J=1,29
ISN 0063               IF(V .LT. (J*5=TVV))GO TO 2
ISN 0065          1    CONTINDE
ISN 0066               J=29
ISN 0067          2    DO 3 I=1,29
ISN 0068               IF(P .LT. (I*5=TVP))GO TO 4
ISN 0070          3    CONTINDE
ISN 0071               I=29
ISN 0072          4    TABLE(J,I)=TABLE(J,I)+1
                C
                C     XXXX ALLOWS ADDITIONS OF LOADS TO A PART. MISSION TYPE XXXXX
ISN 0073               IF(IND8.EQ.0) GO TO 15
ISN 0075               IF(LLL.NE.IND8)RETURN
ISN 0077         15    IF(ISWT.EQ.2)RETURN
ISN 0079               IF(ISWT.EQ.1)GO TO 21
ISN 0081               IC=IC+1
ISN 0082               ISWT=1
ISN 0083               IF(IND9.EQ.0) ISWT=2
                C
                C    XXX INSERT ADDED LOW CYCLES FOR SELECTED MISSIONS XXX
ISN 0085               IF(IC/IV7*IV7.NE.IC)GO TO 21
ISN 0087               IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0089               IR=IR+1
ISN 0090               LIN(IR)=IV8
ISN 0091               IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0093               IR=IR+1
ISN 0094               LIN(IR)=IV9
ISN 0095               IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0097               P=IV9
ISN 0098               V=IV8
ISN 0099               GO TO 10
ISN 0100         21    IF(IND9.EQ.0)RETURN
ISN 0102               IF(IC/IV10*IV10.NE.IC)GO TO 99
ISN 0104               IR=IR+1
ISN 0105               LIN(IR)=IV11
ISN 0106               IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0108               IR=IR+1
ISN 0109               LIN(IR)=IV12
ISN 0110               IF(IR.EQ.10)CALL WRITEM(IR,LIN,8)
ISN 0112               ISWT=2
ISN 0113               P=IV12
ISN 0114               V=IV11
ISN 0115               GO TO 10
ISN 0116         99    RETURN
ISN 0117               END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C  THIS ROUTINE IS USED TO GENERATE THE SPECTRUM LISTING.
                C  LIN=CONTAINS A SINGLE LINE OF DATA
                C  IR=A COUNT OF THE NUMBER OF VALUES PER LINE,NOT > 10.
                C  IO=NUMBER OF THE OUTPUT DATA SET.(8,9,10).
                C
  ISN 0002            SUBROUTINE WRITEM(IR,LIN,IO)
  ISN 0003            REAL LIN(10)
  ISN 0004            WRITE(IO,1)(LIN(I),I=1,IR)
  ISN 0005          1 FORMAT(10F7.1)
  ISN 0006            IR=0
  ISN 0007            RETURN
  ISN 0008            END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                CC   THIS ROUTINE READS A SEED OF DATA ACCORDING TO (IO) 1=AA,2=AG,3=IN.
                CC   THE VALLEY-PEAK SEQUENCE IS NOT DISRUPTED FROM SEED TO SEED.
                C
  ISN 0002              SUBROUTINE READER(I,NP,A,IO,LAS,NM1,EOF,IND)
  ISN 0003              REAL LAS,NM1
  ISN 0004              INTEGER EOF
  ISN 0005              DIMENSION A(1)
  ISN 0006              COMMON/VALLEY/VNM1
  ISN 0007              READ(IO,END=1)(NP,(A(L/2),L=2,NP,2))
                C
                C           V .LT. P .AND.  V .LT. P
  ISN 0008              IF(NM1.LT.LAS.AND.A(1).LT.A(2))GO TO 2
                C
                C           P .GT. V .AND.  P .GT. V
  ISN 0010              IF(NM1.GT.LAS.AND.A(1).GT.A(2))GO TO 2
                C
  ISN 0012              I=2
  ISN 0013              IND=1
  ISN 0014            3 NP=NP/2
  ISN 0015              VNM1=LAS
  ISN 0016              LAS=A(NP)
  ISN 0017              NM1=A(NP-1)
                C       WRITE(9,201) NP,IO
  ISN 0018            201 FORMAT(' NP  =',I9,'       IO=',I3)
  ISN 0019              RETURN
  ISN 0020            1 EOF=1
  ISN 0021              RETURN
  ISN 0022            2 I=1
  ISN 0023              IND=0
  ISN 0024              GO TO 3
  ISN 0025              END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C  THIS SUBROUTINE PERFORMS COLUMN AND LINE TOTALS ON THE
                C  OCCURENCE TABLE.
                C
  ISN 0002            SUBROUTINE DISPLA(MISION)
  ISN 0003            INTEGER X(30),Y(30)
  ISN 0004            INTEGER T
  ISN 0005            COMMON/LAW/ T(30,30),DUM1,DUM2,DUM3(10),LLL
  ISN 0006            DATA X/-50,-45,-40,-35,-30,-25,-20,-15,-10,-5,0,5,10,15,
                     *20,25,30,35,40,45,50,55,60,65,70,75,80,85,90,' TOT'/
  ISN 0007            DATA Y/0,5,10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,
                     *85,90,95,100,105,110,115,120,125,130,135,140,' TOT'/
                C
  ISN 0008            DO 2 J=1,29
  ISN 0009            DO 1 I=1,29
  ISN 0010            T(30,I)=T(30,I)+T(J,I)
  ISN 0011            T(I,30)=T(I,30)+T(I,J)
  ISN 0012          1 T(30,30)=T(30,30)+T(I,J)
  ISN 0013          2 CONTINUE
  ISN 0014            WRITE(9,15)MISION
  ISN 0015         15 FORMAT('1',T59,'TABLEAU',/'+',T59,'TABLEAU',//
                     *T42,'THE NUMBER OF MISSIONS FOR THIS TRIAL IS',I5)
  ISN 0016            WRITE(9,16) X,X
  ISN 0017         16 FORMAT(//9X,29I4,1X,A4,/'+',8X,29I4,1X,A4/)
  ISN 0018            WRITE(9,17) (Y(JCC),Y(JCC),(T(ICC,JCC),ICC=1,30),JCC=1,29)
  ISN 0019         17 FORMAT(3X,I4,/'+',2X,I4,2X,29I4,I5)
  ISN 0020            WRITE(9,18)Y(30),Y(30),(T(ICC,30),ICC=1,29,2),
                     *(T(ICC,30),ICC=2,30,2)
  ISN 0021         18 FORMAT(/3X,A4,/'+',2X,A4,I6,14I8,/9X,14I8,I9,/)
  ISN 0022            RETURN
  ISN 0023            END
```

```
LEVEL 21.7 ( JAN 73 )                          OS/360  FORTRAN H

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=55,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C
                C     THE PURPOSE OF THIS SUBROUTINE IS TO ADJUST SELECTED PEAKS
                C     (AA,AG,IN) BY A GIVEN FACTOR(FAC).
                C
ISN 0002              SUBROUTINE SEV(PEAK,PEAKL,FAC)
ISN 0003              PEAK=PEAK*FAC
ISN 0004              PEAKL=PEAKL*FAC
ISN 0005              RETURN
ISN 0006              END
```

APPENDIX B

SAMPLE PROBLEM WITH INPUT DATA LISTING

INPUT DATA

```
AA          1   9464     52    182      0      0   -5.
A3          1   6764     38    178      0      0  -10.
IN          1    576     12     48      0      0   -5.
AA       9465  18980     52    183      0      0   -5.
A3       6765  13490     38    177      0      0  -10.
IN        577   1152     12     48      0      0   -5.
END
  816   0       0.       0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0       0
        0       0       0       0      0.      0.      0.      0.      0.      0.
        0      0.       0      0.       0       0.      0.      0
        0       0       0
```

OUTPUT DATA

```
  THE NUMBER OF GROUPS IS  6
AA          1   9464     52    182      0      0  -5.0
A3          1   6764     38    178      0      0 -10.0
IN          1    576     12     48      0      0  -5.0
AA       9465  18980     52    183      0      0  -5.0
A3       6765  13490     38    177      0      0 -10.0
IN        577   1152     12     48      0      0  -5.0

MISNUM= 816   LODVAL=   0

IND1= 0       IND2= 0
IND3= 0       IND4= 0
IND5= 0       IV1=    0      IV2=    0      IV3=    0      IV4=    0
IND6= 0       IV5=    0      IV6=    0
IND7= 0       IND8= 0        IND9= 0        IV7=    0      IV8=  0.0
IV9=   0.0    IV10=     0    IV11=   0.0    IV12=  0.0
IND10= 0      IV13=   0.0    IND11= 0       IV14=  0.0    IND12= 0
IV15=  0.0    IV16=   0.0    IND13= 0
IND14= 0      IND15= 0       IND16= 0

THE TOTAL NUMBER OF MISSIONS IS     816
```

TABLEAU

THE NUMBER OF MISSIONS FOR THIS TRIAL IS 816

APPENDIX C

INPUT DATA FOR STUDY SPECTRA VARIATIONS

```
COMPOSITE BASELINE
AA
A3
IV
IA
A3
IVD
E 816
AIR-TO-AIR BASELINE
AA
END
 768
AIR-TO-GROUND BASELINE
A3
END
1092
INSTRUMENTATION AND NAVIGATION BASELINE
IVD
END
 480
```

SEQUENCE OF MISSIONS NO. 1
SEQUENCE OF MISSIONS NO. 2
SEQUENCE OF MISSIONS NO. 3

SEQUENCE OF MISSIONS NO. 4
SEQUENCE OF MISSIONS NO. 5
SEQUENCE OF MISSIONS NO. 6

```
REORDERING OF LOADS WITHIN A MISSION NO. 1
AA          1 40000    52   736    54    32   -5.
END
 768    0      0.      0.      0.      0.      0.      0.      0.      0.
        1       1
        2       0
        3       0       0       0       0       0       0
        4       0       0       0      0.      0.      0
        0      0.       0      0.       0      0.      0.      0.
        0       0       0
REORDERING OF LOADS WITHIN A MISSION NO. 2
A3          1 42420    38   630    40   462  -10.
END
1092    0      0.      0.      0.      0.      0.      0.      0.      0.
        1       1
        2       0
        3       0       0       0       0       0       0
        4       0       0       0      0.      0.      0
        0      0.       0      0.       0      0.      0.      0.
        0       0       0
REORDERING OF LOADS WITHIN A MISSION NO. 3
AA          1  9464    52   182     0     0   -5.
A3          1  6764    38   178     0     0  -10.
IN          1   576    12    48     0     0   -5.
AA       9465 18980    52   183     0     0   -5.
A3       6765 13490    38   177     0     0  -10.
IN        577  1152    12    48     0     0   -5.
END
 816    0      0.      0.      0.      0.      0.      0.      0.      0.
        1       1
        2       0
        3       0       0       0       0       0       0
        4       0       0       0      0.      0.      0
        0      0.       0      0.       0      0.      0.      0.
        0       0       0
```

```
REORDERING OF LOADS WITHIN A MISSION NO. 4
AA          1 40000     52     736     54     32    -5.
END
  768    0       0.      0.      0.      0.      0.      0.      0.      0.      0.
         1       0
         0       0
         0       0       0       0       0       0       0       0
         0       0       0       0       0       0       0       0       0.
         0       0.      0       0.      0       0.      0.      0
         0       0       0

REORDERING OF LOADS WITHIN A MISSION NO. 5
A3          1 42420     38     630     40     462   -10.
END
 1092    0       0.      0.      0.      0.      0.      0.      0.      0.
         1       0
         0       0
         0       0       0       0       0       0       0       0
         0       0       0       0       0       0       0       0       0.
         0       0.      0       0.      0       0.      0.      0
         0       0       0

REORDERING OF LOADS WITHIN A MISSION NO. 6
AA          1   9464     52     182      0      0    -5.
A3          1   6764     38     178      0      0   -10.
IN          1    576     12      48      0      0    -5.
AA       9465  18980     52     183      0      0    -5.
A3       6765  13490     38     177      0      0   -10.
IN        577   1152     12      48      0      0    -5.
END
  816    0       0.      0.      0.      0.      0.      0.      0.      0.
         1       0
         0       0
         0       0       0       0       0       0       0       0
         0       0       0       0       0       0       0       0       0.
         0       0.      0       0.      0       0.      0.      0
         0       0       0
```

MISSION MIX NO. 1
A4 1 18696
A3 1 12088
A4 1 38060
A3 18697 38060
E7J2 2089 38060
1031

MISSION MIX NO. 2
A4 1 18696
A3 1 18004
A4 2029 40000
A3 18697 38060
E7J2
1060

MISSION MIX NO. 3
A4 1 2028
A3 1 14516
A4 1 14516
A3 2029 40000
E7J2 14517 29300
937

MISSION MIX NO. 4
A4 1 5980
A3 1 14516
A4 5981 11960
A3 14517 29300
E7J2
994

MISSION MIX NO. 5
MISSION MIX NO. 6
MISSION MIX NO. 7
MISSION MIX NO. 8

MISSION MIX NO. 9
AA 1 13988
A3 1 12090
IV 1 5576
AA 13989 27976
A3 12091 41442
IVV 577 1152
E743
MISSION MIX NO. 10
AA 1 17992
A3 1 12090
AA 17993 35932
A3 12091 41442
EVV
E80C
MISSION MIX NO. 11
AA 1 17992
IV 1 2888
AA 17993 35932
IVV 289 5776
E739
MISSION MIX NO. 12
AA 1 19968
A3 1 12464
IVV 1 11552
E808

MISSION MIX NO. 13
MISSION MIX NO. 14
MISSION MIX NO. 15
MISSION MIX NO. 16 AND 17

```
MISSION MIX NO. 18 AND 19
AA        1  5980    52    115      0      0    -5.
A3        1 10374    38    273      0      0   -10.
IN        1   576    12     48      0      0    -5.
AA     5981 11960    52    115      0      0    -5.
A3    10375 20748    38    273      0      0   -10.
IN      577  1152    12     48      0      0    -5.
END
 872     0     0.    0.    0.    0.    0.    0.    0.    0.
         0     0
         0     0
         0     0     0     0     0     0     1   115   216
         0     0     0     0     0.    0.    0     0.    0.
         0     0.    0     0.    0     0.    0.    0
         0     0     0

MISSION MIX NO. 20 AND 21
AA        1 13988    52    269      0      0    -5.
A3        1  2090    38     55      0      0   -10.
IN        1   576    12     48      0      0    -5.
AA    13989 27976    52    269      0      0    -5.
A3     2091  4142    38     54      0      0   -10.
IN      577  1152    12     48      0      0    -5.
END
 743     0     0.    0.    0.    0.    0.    0.    0.    0.
         0     0
         0     0
         1     0   270   372   504     0     0     0     0
         0     0     0     0     0.    0.    0     0.    0.
         0     0.    0     0.    0     0.    0.    0
         0     0     0

MISSION MIX NO. 22 AND 23
A3        1 18696    38    492      0      0   -10.
IN        1   288    12     24      0      0    -5.
A3    18697 38060    38    138     40    353   -10.
IN      289   576    12     24      0      0    -5.
END
1031     0     0.    0.    0.    0.    0.    0.    0.    0.
         0     0
         0     0
         0     0     0     0     0     0     1     0   401
         0     0     0     0     0.    0.    0     0.    0.
         0     0.    0     0.    0     0.    0.    0
         0     0     0
```

```
MISSION MIX NO. 24 AND 25
AA          1   9464      52    182      0      0   -5.
A3          1   6764      38    178      0      0  -10.
IN          1    576      12     48      0      0   -5.
AA       9465  18980      52    183      0      0   -5.
A3       6765  13490      38    177      0      0  -10.
IN        577   1152      12     48      0      0   -5.
END
 816    0        0.       0.      0.      0.      0.      0.      0.      0.
        0         0
        0         0
        1         0     101       0       0       0       0       0       0
        0         0       0      0.      0.      0.      0.      0.      0.
        0        0.       0      0.       0      0.      0.       0
        0         0       0

MISSION MIX NO. 26
AA          1   9464      52    182      0      0   -5.
A3          1   6764      38    178      0      0  -10.
IN          1    576      12     48      0      0   -5.
AA       9465  18980      52    183      0      0   -5.
A3       6765  13490      38    177      0      0  -10.
IN        577   1152      12     48      0      0   -5.
END
 816    0        0.       0.      0.      0.      0.      0.      0.      0.
        0         0
        0         0
        1       491     592       0       0       0       0       0       0
        0         0       0       0      0.      0.      0.      0.      0.
        0        0.       0      0.       0      0.      0.       0
        0         0       0

MISSION MIX NO. 27 AND 28
AA          1   9464      52    182      0      0   -5.
A3          1   6764      38    178      0      0  -10.
IN          1    576      12     48      0      0   -5.
AA       9465  18980      52    183      0      0   -5.
A3       6765  13490      38    177      0      0  -10.
IN        577   1152      12     48      0      0   -5.
END
 816    0        0.       0.      0.      0.      0.      0.      0.      0.
        0         0
        0         0
        1         0     183     408     592       0       0       0       0
        0         0       0       0      0.      0.      0.      0.      0.
        0        0.       0      0.       0      0.      0.       0
        0         0       0
```

INDIVIDUAL FLIGHT LENGTH NO. 1
INDIVIDUAL FLIGHT LENGTH NO. 2
INDIVIDUAL FLIGHT LENGTH NO. 3
INDIVIDUAL FLIGHT LENGTH NO. 4

```
INDIVIDUAL FLIGHT LENGTH NO. 5
AA          1 40000    104     368     108      16    -5.
END
 384    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       0.       0.
        0        0        0

INDIVIDUAL FLIGHT LENGTH NO. 6
A3          1 42420     76     315      80     231   -10.
END
 545    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       0.       0.
        0        0        0

INDIVIDUAL FLIGHT LENGTH NO. 7
IZ          1  5340     24     135      20     105    -5.
END
 240    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       0.       0.
        0        0        0

INDIVIDUAL FLIGHT LENGTH NO. 8
AA          1   9464    104      91       0       0    -5.
A3          1   6764     76      89       0       0   -10.
IZ          1    576     24      24       0       0    -5.
AA       9465  18980    104      91      52       1    -5.
A3       6765  13490     76      88      38       1   -10.
IZ        577   1152     24      24       0       0    -5.
END
 409    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       0.       0.
        0        0        0
```

```
TRUNCATION VARIATION NO. 1
AA              1 40000     52    736     54     32    -5.
END
 768    0        0.      0.       0.       0.      0.      0.      0.      0.      0.
        0         0
        0         0
        0         0       0        0        0       0       0       0
        1         0       1        2     12.5      30.     10    12.5      40.
        0        0.       0        0.       0      0.      0.       0
        0         0       0

TRUNCATION VARIATION NO. 2
AA              1  9464     52    182      0       0    -5.
A3              1  6764     38    178      0       0   -10.
IV              1   576     12     48      0       0    -5.
AA           9465 18980     52    183      0       0    -5.
A3           6765 13490     38    177      0       0   -10.
IV            577  1152     12     48      0       0    -5.
END
 816    0        0.      0.       0.       0.      0.      0.      0.      0.      0.
        0         0
        0         0
        0         0       0        0        0       0       0       0
        1         1       1        2     12.5      30.     10    12.5      40.
        0        0.       0        0.       0      0.      0.       0
        0         0       0

TRUNCATION VARIATION NO. 3
AA              1  9464     52    182      0       0    -5.
A3              1  6764     38    178      0       0   -10.
IV              1   576     12     48      0       0    -5.
AA           9465 18980     52    183      0       0    -5.
A3           6765 13490     38    177      0       0   -10.
IV            577  1152     12     48      0       0    -5.
END
 816    0        0.      0.       0.       0.      0.      0.      0.      0.      0.
        0         0
        0         0
        0         0       0        0        0       0       0       0
        0         0       0        0       0.      0.      0.      0.      0.
        1       35.       0       0.        0      0.      0.       0
        0         0       0

TRUNCATION VARIATION NO. 4
AA              1  9464     52    182      0       0    -5.
A3              1  6764     38    178      0       0   -10.
IV              1   576     12     48      0       0    -5.
AA           9465 18980     52    183      0       0    -5.
A3           6765 13490     38    177      0       0   -10.
IV            577  1152     12     48      0       0    -5.
END
 816    0        0.      0.       0.       0.      0.      0.      0.      0.      0.
        0         0
        0         0
        0         0       0        0        0       0       0       0
        0         0       0        0       0.      0.      0.      0.      0.
        1       45.       0       0.        0      0.      0.       0
        0         0       0
```

```
TRUNCATION VARIATION NO. 5
AA          1   9464     52   182      0      0   -5.
A3          1   6764     38   178      0      0  -10.
IN          1    576     12    48      0      0   -5.
AA       9465  18980     52   183      0      0   -5.
A3       6765  13490     38   177      0      0  -10.
IN        577   1152     12    48      0      0   -5.
END
 816    0        0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0.       0.
        1      55.        0        0.       0        0.       0.       0
        0        0        0

TRUNCATION VARIATION NO. 6
AA          1   9464     52   182      0      0   -5.
A3          1   6764     38   178      0      0  -10.
IN          1    576     12    48      0      0   -5.
AA       9465  18980     52   183      0      0   -5.
A3       6765  13490     38   177      0      0  -10.
IN        577   1152     12    48      0      0   -5.
END
 816    0        0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0.       0.
        1      65.        0        0.       0        0.       0.       0
        0        0        0

TRUNCATION VARIATION NO. 7
AA          1   9464     52   182      0      0   -5.
A3          1   6764     38   178      0      0  -10.
IN          1    576     12    48      0      0   -5.
AA       9465  18980     52   183      0      0   -5.
A3       6765  13490     38   177      0      0  -10.
IN        577   1152     12    48      0      0   -5.
END
 816    0        0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        1        0        1       10     12.5       65.      20     12.5       65.
        1      55.        0        0.       0        0.       0.       0
        0        0        0

TRUNCATION VARIATION NO. 8
AA          1   9464     52   182      0      0   -5.
A3          1   6764     38   178      0      0  -10.
IN          1    576     12    48      0      0   -5.
AA       9465  18980     52   183      0      0   -5.
A3       6765  13490     38   177      0      0  -10.
IN        577   1152     12    48      0      0   -5.
END
 816    0        0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
```

```
TRUNCATION VARIATION NO. 9
AA          1   9464   52   182      0      0    -5.
A3          1   6764   38   178      0      0   -10.
IN          1    576   12    48      0      0    -5.
AA       9465  18980   52   183      0      0    -5.
A3       6765  13490   38   177      0      0   -10.
IN        577   1152   12    48      0      0    -5.
END
 816    0       0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0.      0.      0       0.      0.
        0       0.      1       95.     0       0.      0.      0
        0       0       0

TRUNCATION VARIATION NO. 10
AA          1   9464   52   182      0      0    -5.
A3          1   6764   38   178      0      0   -10.
IN          1    576   12    48      0      0    -5.
AA       9465  18980   52   183      0      0    -5.
A3       6765  13490   38   177      0      0   -10.
IN        577   1152   12    48      0      0    -5.
END
 816    0       0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0.      0.      0       0.      0.
        1     101.      0       0.      0       0.      0.      0
        0       0       0

TRUNCATION VARIATION NO. 11
AA          1  40000   52   736     54     32    -5.
END
 768    0       0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0.      0.      0       0.      0.
        1     114.      0       0.      0       0.      0.      0
        0       0       0

TRUNCATION VARIATION NO. 12
AA          1   9464   52   182      0      0    -5.
A3          1   6764   38   178      0      0   -10.
IN          1    576   12    48      0      0    -5.
AA       9465  18980   52   183      0      0    -5.
A3       6765  13490   38   177      0      0   -10.
IN        577   1152   12    48      0      0    -5.
END
 816    1      12.5   101.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0.      0.      0       0.      0.
        0       0.      0       0.      0       0.      0.      1
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0.      0.      0       0.      0.
        0       0.      1       85.     0       0.      0.      0
        0       0       0
```

```
TRUNCATION VARIATION NO. 13
AA          1   9464     52    182      0      0   -5.
A3          1   6764     38    178      0      0  -10.
IN          1    576     12     48      0      0   -5.
AA       9465  18980     52    183      0      0   -5.
A3       6765  13490     38    177      0      0  -10.
IN        577   1152     12     48      0      0   -5.
END
 B16    2     12.5     101.     12.5     101.      0.      0.      0.      0.
        0        0
        0        0
        0        0        0        0        0        0        0
        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       1.
        0        0        0

TRUNCATION VARIATION NO. 14
AA          1   9464     52    182      0      0   -5.
A3          1   6764     38    178      0      0  -10.
IN          1    576     12     48      0      0   -5.
AA       9465  18980     52    183      0      0   -5.
A3       6765  13490     38    177      0      0  -10.
IN        577   1152     12     48      0      0   -5.
END
 B16    4     12.5     101.     12.5     101.     12.5     101.     12.5     101.
        0        0
        0        0
        0        0        0        0        0        0        0
        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       1.
        0        0        0

TRUNCATION VARIATION NO. 15 (USES TRUNCATION VARIATIONS 16 AND 17)

TRUNCATION VARIATION NO. 16
AA          1   9464     52    182      0      0   -5.
A3          1   6764     38    178      0      0  -10.
IN          1    576     12     48      0      0   -5.
AA       9465  18980     52    183      0      0   -5.
A3       6765  13490     38    177      0      0  -10.
IN        577   1152     12     48      0      0   -5.
END
 B16    1     12.5     115.      0.      0.      0.      0.      0.      0.
        0        0
        0        0
        0        0        0        0        0        0        0
        0        0        0        0        0        0        0
        0       0.        0       0.        0       0.       1.
        0        0        0
```

TRUNCATION VARIATION NO. 17
TRUNCATION VARIATION NO. 18
TRUNCATION VARIATION NO. 19
TRUNCATION VARIATION NO. 20

```
COMPRESSION LOADS NO. 1
AA          1  40000    52    736     54     32    -5.
END
768     0         0.        0.        0.        0.        0.        0.        0.        0.
        0         0
        0         0
        0         0         0         0         0         0         0         0
        0         0         0         0         0.        0.        0         0.        0.
        0         0.        0         0.        1         0.        1.        0
        0         0         0

COMPRESSION LOADS NO. 2
A3          1  42420    38    630     40    462   -10.
END
1092    0         0.        0.        0.        0.        0.        0.        0.        0.
        0         0
        0         0
        0         0         0         0         0         0         0         0
        0         0         0         0         0.        0.        0         0.        0.
        0         0.        0         0.        1         0.        1.        0
        0         0         0

COMPRESSION LOADS NO. 3
IN          1   5340    12    270     10    210    -5.
END
480     0         0.        0.        0.        0.        0.        0.        0.        0.
        0         0
        0         0
        0         0         0         0         0         0         0         0
        0         0         0         0         0.        0.        0         0.        0.
        0         0.        0         0.        1         0.        1.        0
        0         0         0

COMPRESSION LOADS NO. 4
AA          1   9464    52    182      0      0    -5.
A3          1   6764    38    178      0      0   -10.
IN          1    576    12     48      0      0    -5.
AA       9465  18980    52    183      0      0    -5.
A3       6765  13490    38    177      0      0   -10.
IN        577   1152    12     48      0      0    -5.
END
816     0         0.        0.        0.        0.        0.        0.        0.        0.
        0         0
        0         0
        0         0         0         0         0         0         0         0
        0         0         0         0         0.        0.        0         0.        0.
        0         0.        0         0.        1         0.        1.        0
        0         0         0
```

COMPRESSION LOADS NO. 8
COMPRESSION LOADS NO. 9
COMPRESSION LOADS NO. 10

```
EXCEEDANCE CURVE VARIATION NO: 1
AA          1 45400     58   340     60    428    -5.
END
 768    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0.
        0       0.        0       0.        0       0.       0.        0
        0        0        0

EXCEEDANCE CURVE VARIATION NO: 2
AA          1 40400     52   536     54    232    -5.
END
 768    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0.
        0       0.        0       0.        0       0.       0.        0
        0        0        0

EXCEEDANCE CURVE VARIATION NO: 3
AA          1 38200     48   100     50    668    -5.
END
 768    0       0.       0.       0.       0.       0.       0.       0.       0.
        0        0
        0        0
        0        0        0        0        0        0        0        0
        0        0        0        0        0        0        0        0.
        0       0.        0       0.        0       0.       0.        0
        0        0        0
```

```
EXCEEDANCE CURVE VARIATION NO. 4
AA          1 36600     46   132     48   636    -5.
END
 768    0      0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0       0       0       0       0.
        0      0.       0       0.      0       0.      0.      0
        0       0       0

EXCEEDANCE CURVE VARIATION NO. 5
AA          1 38000     48   200     50   568    -5.
END
 768    0      0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0       0       0       0       0.
        0      0.       0       0.      0       0.      0.      0
        0       0       0

EXCEEDANCE CURVE VARIATION NO. 6
AA          1 33600     42    96     44   672    -5.
END
 768    0      0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0       0       0       0       0       0.
        0      0.       0       0.      0       0.      0.      0
        0       0       0
```

```
COUPLING OF PEAKS AND VALLEYS NO. 1
AA          1 42794     54   107     56   661   -5.
END
 768    0       0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0      0.      0.      0.      0.      0.
        0      0.       0      0.       0       0.     0.       0
        2       0       0

COUPLING OF PEAKS AND VALLEYS NO. 2
A3          1 47182     42   433     44   659  -10.
END
1092    0       0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0      0.      0.      0.      0.      0.
        0      0.       0      0.       0       0.     0.       0
        0       0       0

COUPLING OF PEAKS AND VALLEYS NO. 3
AA          1 40724     52   374     54   394   -5.
END
 768    0       0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0      0.      0.      0.      0.      0.
        0      0.       0      0.       0       0.     0.       0
        3       0       0

COUPLING OF PEAKS AND VALLEYS NO. 4
A3          1 44040     40   912     42   180  -10.
END
1092    0       0.      0.      0.      0.      0.      0.      0.      0.      0.
        0       0
        0       0
        0       0       0       0       0       0       0       0
        0       0       0       0      0.      0.      0.      0.      0.
        0      0.       0      0.       0       0.     0.       0
        0       0       0
```

```
COUPLING OF PEAKS AND VALLEYS NO. 5
AA          1 43166      56   689      58    79    -5.
END
 768    0       0.       0.       0.       0.       0.       0.       0.       0.
        0       0
        0       0
        0       0        0        0        0        0        0        0
        0       0        0        0        0        0        0        0        0.
        0       0.       0        0.       0        0.       0.       0
        4       0        0

COUPLING OF PEAKS AND VALLEYS NO. 6
A3          1 45964      42  1042      44    50   -10.
END
1092    0       0.       0.       0.       0.       0.       0.       0.       0.
        0       0
        0       0
        0       0        0        0        0        0        0        0
        0       0        0        0        0        0        0        0        0.
        0       0.       0        0.       0        0.       0.       0
        0       1        0

COUPLING OF PEAKS AND VALLEYS NO. 7
AA          1   9464     52   182       0     0    -5.
A3          1   6764     38   178       0     0   -10.
I4          1    576     12    48       0     0    -5.
AA       9465  18983     52   183       0     0    -5.
A3       6765  13490     38   177       0     0   -10.
I4        577   1152     12    48       0     0    -5.
END
 816    0       0.       0.       0.       0.       0.       0.       0.       0.
        0       0
        0       0
        0       0        0        0        0        0        0        0
        0       0        0        0        0        0        0        0        0.
        0       0.       0        0.       0        0.       0.       0
        0       0        1
```

```
COMBINED VARIATION NO. 1
AA          1 13988   52    269      0       0    -5.
A3          1  2090   38     55      0       0   -10.
IN          1   576   12     48      0       0    -5.
AA      13989 27976   52    269      0       0    -5.
A3       2091  4142   38     54      0       0   -10.
IN        577  1152   12     48      0       0    -5.
END
 743    0        0.      0.      0.      0.      0.      0.      0.      0.
        0        0
        0        0
        1        0      270     372     504       0       0       0
        0        0        0       0      0.      0.       0      0.      0.
        1      65.        0      0.       0      0.      0.       0
        0        0        0
COMBINED VARIATION NO. 2
AA          1 13988   52    269      0       0   -30.
A3          1  2090   38     55      0       0   -30.
IN          1   576   12     48      0       0   -30.
AA      13989 27976   52    269      0       0   -30.
A3       2091  4142   38     54      0       0   -30.
IN        577  1152   12     48      0       0   -30.
END
 743    0        0.      0.      0.      0.      0.      0.      0.      0.
        0        0
        0        0
        1        0      270     372     504       0       0       0
        0        0        0       0      0.      0.       0      0.      0.
        0       0.        0      0.       0      0.      0.       0
        0        0        0
COMBINED VARIATION NO. 3
AA          1  7816   42     96     44      86    -5.
A3          1  6764   38    178      0       0   -10.
IN          1   576   12     48      0       0    -5.
AA       7817 15868   44    183      0       0    -5.
A3       6765 13490   38    177      0       0   -10.
IN        577  1152   12     48      0       0    -5.
END
 816    0        0.      0.      0.      0.      0.      0.      0.      0.
        0        0
        0        0
        0        0        0       0       0       0       0       0
        0        0        0       0      0.      0.       0      0.      0.
        0       0.        0      0.       0      0.      0.       0
        0        0        0
```

COMBINED VARIATION NO. 7
COMBINED VARIATION NO. 8
COMBINED VARIATION NO. 9

APPENDIX D

LIST OF COMPUTER PROGRAM SYMBOLS AND DEFINITIONS

MAIN PROGRAM

I	An integer counter for the number of items in the mission mix
J	A do loop control variable used throughout the main program
L	The main process loop control variable
M	A do loop used when the multiple mission types are tallied
AA	A real array used to store one input array of Air-to-Air raw data
AG	A real array used to store one input array of Air-to-Ground raw data
ID	An integer mission mix counter
II	A do loop control used when printing the input data
IN	A real array used to store one input array of Instrument raw data
IQ	A do loop control used to select the raw data from each raw data input array
IR	An integer line counter
IS	A do loop control used when an initial mission type does not start at the beginning of the raw data
IV	A do loop control used to read the four added peaks and valleys
JJ	A do loop control used when printing the input data
LL	The number of load per mission
END	An end of file check
FAC	An escalation factor used to increase severity
IAA	An integer peak and valley counter for Air-to-Air type missions
IAG	An integer peak and valley counter for Air-to-Ground type missions
ICT	A counter used to talley the seven possible added high loads
IIN	An integer Instrument mission type peak and valley counter
IV1-IV9	(See input parameters)

PROGRAM SYMBOLS (MAIN) (Continued)

LIN	The output line counter
LLL	The mission type indicator
MIX	The mission mix storage array
SEV	The severity subroutine
TAB	The occurrence table subroutine
TVP	An occurrence table constraint for peaks
TVV	An occurrence table constraint for valleys
ADDP	Used for adding additional high peaks
ADDV	Used for adding additional high valleys
FREQ	The interval used for adding additional high loads
IND1-IND9	(See input parameters)
ISAA	A peak and valley counter switch for Air-to-Air type missions
ISAG	A peak and valley counter switch for Air-to-Ground type missions
ISIN	A peak and valley counter switch for Instrument type missions
IV10-IV16	(See input parameters)
IZIP	An integer counter
NPAA	The number of points in an Air-to-Air input array
NPAG	The number of points in an Air-to-Ground input array
NPIN	The number of points in an Instrument input array
ORDA	A subroutine which orders or reorders missions by some preset convention
PEAK	The peaks used during a single mission
VNM1	V(N-1) the prior valley at the time of use
AADUM	A dummy variable used to insure the proper peak valley couple at the beginning of the first Air-to-Air input array
AALAS	A dummy variable used to insure the proper peak valley couple at the end of each Air-to-Ground input array
AANM1	AA(N-1) the last value of the prior Air-to-Air input array

PROGRAM SYMBOLS (MAIN) (Continued)

AGDUM	A dummy variable used to insure the proper peak valley couple at the beginning of the first Air-to-Ground input array
AGLAS	A dummy variable used to insure the proper peak valley couple at the end of each Air-to-Ground input array
AGNM1	AG(N-1) the last value of the prior Air-to-Ground input array
EOFAA	The end of file check for Air-to-Air missions
EOFAG	The end of file check for Air-to-Ground missions
EOFIN	The end of file check for Instrument missions
GLOAD	The ground load
HWMNY	A range number used in computing various mixes
INDAA	An integer switch used in selecting Air-to-Air input array
INDAG	An integer switch used in selecting Air-to-Ground input array
INDIN	An integer switch used in selecting Instrument input array
INDUM	A dummy variable used to insure the proper peak and valley couple at the beginning of the first Instrument input array
IND10-IND16	(See input parameters)
INLAS	A dummy variable used to insure the proper peak and valley couple at the end of each Instrument input array
INNM1	IN(N-1) the last value of the prior Instrument input array
INPAA	For Air-to-Air type missions INPAA = (1) the next input array starts with a valley INPAA = (2) the next input array starts with a peak
INPAG	For Air-to-Ground type missions INPAG = (1) the next input array starts with a valley INPAG = (2) the next input array starts with a peak
INPIN	For Instrument type missions INPIN = (1) the next input array starts with a valley INPIN = (2) the next input array starts with a peak
IPICK	A binary switch used to select a peak or valley at any point in any mission
LINE1	An input carrier array
LIST1	This array is used to identify the input mission mix

PROGRAM SYMBOLS (MAIN) (Concluded)

LLINC	Counts the peaks and valleys in each mission
MIXIT	Counts the types of missions in any mix
MTYPE	Stores the mission types for use in the program
ORDER	A subroutine which reorders peaks and valleys within a mission
SORTF	An entry point into subroutine SORTP used when all missions have been entered and the sorting of missions is about to occur.
SORTP	The mission ordering subroutine, entered at the end of each mission where the peaks and valleys of the mission are recorded on a direct access device for later sorting
TABLE	A subroutine which compiles the occurrence table and performs common mission variations
WHERE	The lower limit of each input array
DISPLA	The subroutine with at the end of run prints the occurrence table
GLOADS	The storage array for all ground loads
HILOAD	The subroutine which adds selected high loads to missions
IERROR	A switch used to indicate that the final seed or mission does not end in a ground load
ISTART	An integer switch used when a desired mission does not start at the beginning of an input array
LLIBIT	Product of the number of cycles per mission and the number of missions
LODVAL	The number of added high loads
MISION	The mission counter
MISNUM	The number of missions
READER	An input routine used to read and adjust each new input array
VALLEY	A valley storage array used for reordering of peak valley pairs within a mission and for storing missions to be reordered
WRITEM	A subroutine which is called each time a complete line of ten peaks and valleys are formed.

PROGRAM SYMBOLS (READER)

A	The A array contains one seed of peaks and valleys
I	A control variable I = (1) the seed starts with a valley I = (2) the seed starts with a peak An integer constant
IO	The data set reference number IO = (1) is an Air-to-Air mission IO = (2) is an Air-to-Ground mission IO = (3) is an Instrument mission
NP	The number of data points in each seed
EOF	The end of file indicator
IND	An indicator which shows the type of couple that was made between two seeds
LAS	The last value of the new seed
NM1	The next to last value of the new seed
VNM1	The last value of the prior seed

PROGRAM SYMBOLS (TAB)

I	A do loop control variable
J	A do loop control variable
P	The single peak that is entered via the call argument list
V	The single valley that is entered via the call argument list
IC	An integer counter
IR	A counter which ten output values per line
NP	The number of points in a seed
IV1 →	IV9 (See input parameters)
LIN	Storage line for each print line
LLL	An integer switch
TVP	An occurrence table constraint for peak
TVV	An occurrence table constraint for valleys
VGL	No change in ground load check
IND1 →	IND9 (See input parameters)
IV10 →	IV16 (See input parameters)
ISWT	An interger switch
GLØAD	The ground load
IND10 →	IND16 (See input parameters)
NEXTV	The next logical valley
NP1NC	The number of points in a seed times the frequency of points between ground loads
TABLE	The storage array for the occurrence table
WRITEM	A subroutine which is called each time a complete line of ten peaks and valleys are formed

PROGRAM SYMBOLS (DISPLA)

I	A do loop control variable
J	A do loop control variable
T	The storage array for the occurrence table
X	Labels for the occurrence plot ordinate
Y	Labels for the occurrence plot absicca
ICC	An integer subscript
JCC	An integer subscript
LLL	Dummy common value
DUM1 →	DUM3 dummy common value
MISION	The mission counter

PROGRAM SYMBOLS (WRITEM)

I	A do loop control variable
IO	The data set reference number
IR	The number of data values per line
LIN	An array which contain ten or less output values

PROGRAM SYMBOLS (HILOAD)

I	A counter used to limit the number of high loads added
P	The peak for which the high load is substituted
V	The valley for which the high load is substituted
PL	The line value of the peak
VL	The line value of the valley
ADDP	The added peak array
ADDV	The added valley array
GLOAD	The ground load
LASMIS	A same mission check
LODVAL	A dummy common value not used in this subroutine

PROGRAM SYMBOLS (SEV)

FAC	The added severity factor
PEAK	The peak to be altered from the AA, AG or IN array
PEAKL	The peak to be altered from the print array LIN

PROGRAM SYMBOLS (ORDER)

I	A do loop control used in search for the largest peak in each mission
J	An array which holds the element number of the largest peak in each mission
K	A do loop control used for printing the ordered mission
M	A do loop control used in the sorting outer loop
N	A do loop control used in the sorting inner loop
P	The peaks for a single mission
V	The valleys for a single mission
IO	The relative key used in reading the missions in an ordered manner
IR	The line item counter
IND	The part of the world is already in order indicated switch used in the sorting technique
IV1	IV16 (See input parameters)
IND1	IND16 (See input parameters)
LIN	The print array used for printing each line of output
IFLT	The number of flights in the run
GLØAD	The ground load
IPASS	Not used
LLINC	The number of peaks and valleys in a mission
VALUE	An intermediate value used in sorting
IFLTML	The total number of flights minue one, used in the sorting technique
PEAKMX	An array which stores the maximum peak of each mission to be sorted at the conclusion of the run

PROGRAM SYMBOLS (SORTP)

I	A do loop control variable used in the outer sorting loop
J	A do loop control variable used in the inner sorting loop
K	A sorting interchange temporary variable
N	An integer array of size one hundred used in the sorting technique
P	The peaks for a single mission
V	The valleys for a single mission
IR	The line item counter
IX	Not used
IND	The part of the world is already in order indicator switch used in the sorting technique
IV1 → IV9	(See input parameters)
LIN	The print array used for printing each line of input
LM1	The number of values in a mission minus one used by the sorting technique
IND1 → IND16	(See input parameters)
IV10 → IV16	(See input parameters)
GLOAD	The ground load
LLINC	The number of peaks and valleys in a mission
IERROR	The last value is a ground load valley indicator

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